Fire Weather Annual Report
Southeast Idaho
2011

Pocatello Fire Weather Office
Pocatello, Idaho

DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Weather Service

2011 Fire Weather Annual Report

National Weather Service – Pocatello Fire Weather Office

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1. Introduction:

The National Weather Service, Weather Forecast Office at Pocatello, Idaho has Fire Weather Forecast responsibility for portions of Idaho serviced by the Central, Eastern and Southern Interagency Dispatch Centers (Figure 1). The Pocatello Fire Weather Office produces this Annual Fire Weather Report. Previous reports are maintained up to five years.

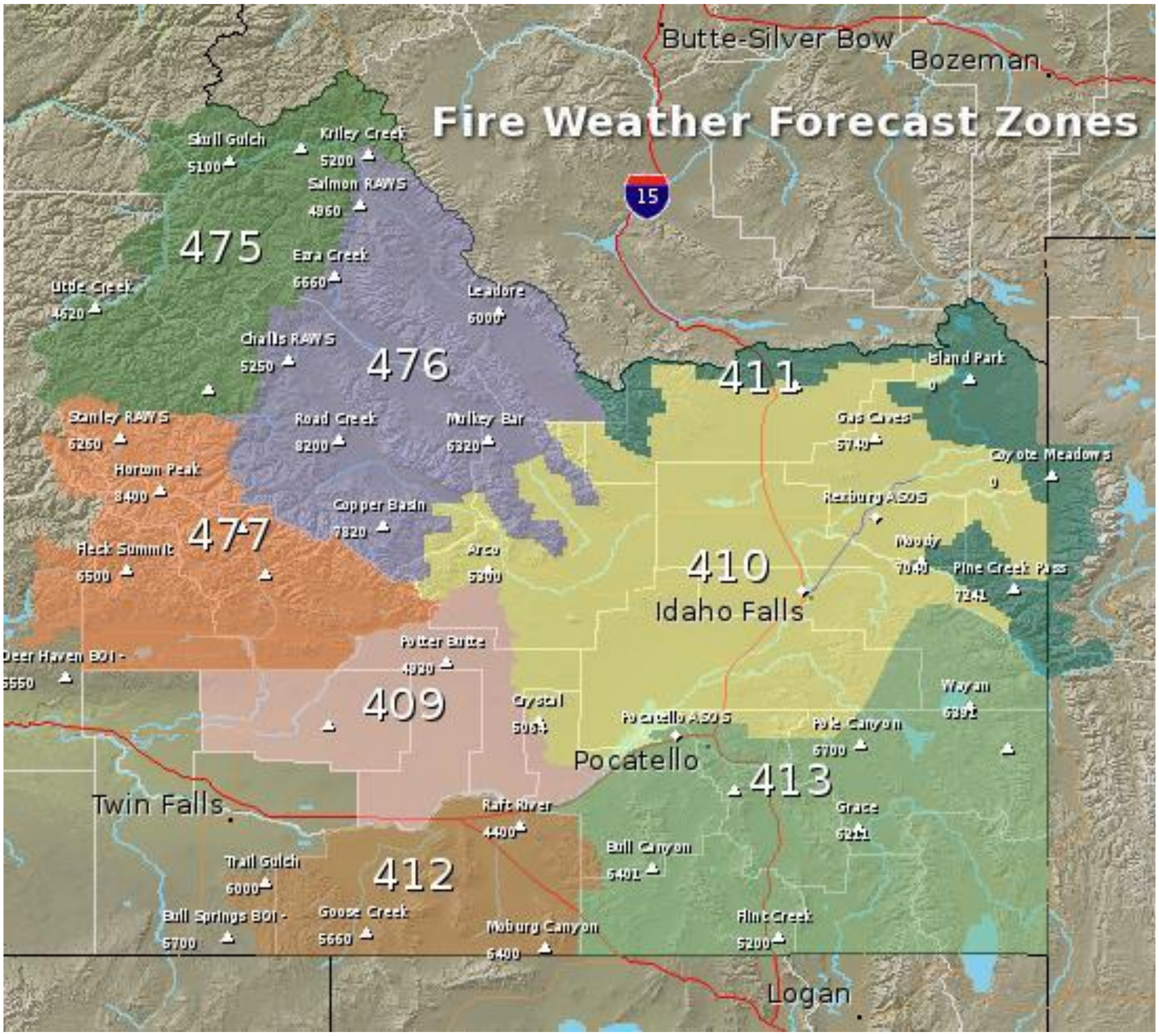

Figure 1 WFO Pocatello Fire Weather area of responsibility (solid color areas).

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2. Overview of the fire season:

The El Niño/Southern Oscillation Index (ENSO) indicated that water temperatures in the central and eastern equatorial Pacific showed a cooling trend beginning around July of 2010. This trend continued into the winter months becoming a moderate to strong La Nina event by December of 2010, which gradually weakened between February and May, 2011. A La Nina pattern typically favors persistent high pressure centered in the Gulf of Alaska with individual storm systems either tracking north of the high then dropping southeast to Idaho; or westerly winds which undercut the high and bring storm systems directly off the Pacific to Idaho.

The El Nino/Southern Oscillation (ENSO) cycle occurs over a two to seven year period and refers to conditions of sea surface temperatures in the tropical Pacific Ocean. Researchers have identified other cyclic patterns besides ENSO around the globe that may affect long term weather patterns. Some of these cyclic patterns may span 10 or even 30 years. La Nina (colder than normal) and El Nino (warmer than normal) are terms associated with extremes in the ENSO cycle. The ENSO cycle has a strong influence on global climate patterns and is a major player in long term climate outlooks.

The observed storm track during the month of October 2010 was characteristic of a transition to La Nina with a split flow pattern in the Eastern Pacific and storm systems tracking into central and southern California. These storms then tracked northeast through the Great Basin to bring widespread rain to southeast Idaho. All but the Arco Desert and Birch Creek Valley received in excess of one inch of rain which helped bring an end to the 2010 fire season. The La Nina pattern became well established in November and December, high pressure developed in the Eastern Pacific with persistent northwest to north winds bringing colder air and above normal precipitation into much of Idaho. As the New Year arrived, the pattern began to change from a more typical La Nina event to one modified by the Artic Oscillation. The Artic Oscillation Index shifted from negative phase during November through January to positive phase in February through March. This permitted high pressure, normally over the Gulf of Alaska during a La Nina event, to shift a little further west towards the Aleutians. This allowed storm systems to pick up additional moisture as they tracked through the gulf and resulted in below normal temperatures and above normal precipitation through the winter-spring time period.

The Artic Oscillation Index tracks differences in sea level pressure between the north polar regions and the mid-latitudes about 37-45N. In the negative phase, pressure differences are not as strong, the mid-latitude westerly winds are lighter and cold air from the Polar Regions can slide south. During the positive phase, the sea level pressure difference is greater, mid-latitude winds are stronger and cold polar air is held farther north. The AO can change phase in as little as 2-3 weeks with dramatic effects on winter weather and has been referred to lately as the “wild card” in the prevailing La Nina pattern.

Basin averaged precipitation as reported by the SNOTEL observation network (Figure 2.1a) got off to an excellent start in October 2010. There was a short reprieve around the time the Artic Oscillation changed phase in late January and February, then storm systems resumed their pace through the spring months. The Henry's Fork, Teton, Bear River Basins, and Upper Snake River head waters received basin averaged precipitation of 125 to 150 percent of average. The really big story this winter can be seen in the mountain snow packs as determined from the water equivalent of the snow (Figure 2.1b). From late April through early June the snow packs in several areas were approaching 200 percent of average (Figure 2.1c). The National Resource Conservation Service reported in their Basin Outlook Report for June, 2011 that the Bear River basin had received the highest snow pack since the record began in 1981.

The combined effects of La Nina and the Artic Oscillation resulted in temperatures three to seven degrees below normal (Figure 2.2c) during spring. Snow packs well above normal combined with below normal temperatures lasting into early June created a very anomalous situation of late peaking snow packs. This is particularly evident in a time line of snow water equivalent for the Bear River Basin (Figure 2.3). Melting snow water helped fill Bear Lake reservoir to about 90 percent of capacity after 10 years of drought.

Water temperatures in the central and eastern Pacific gradually returned to normal in June and the La Nina event gave way to an ENSO-neutral state. High pressure would develop over the southwestern states for periods of time in July and August. The southwest area monsoon brought five or six northward surges of moisture and thunderstorms into the Great Basin, but this was cut short again this year by westerlies off the Pacific and the monsoon period was pretty much over by the end of August. The ENSO-neutral period was short lived as the trend towards the fall would be a return to La Nina and colder than normal waters in the equatorial central Pacific.

The first major storm system of the fall occurred between October 4th and 7th when a Pacific storm brought widespread rain and snow to southeast Idaho. Over the four day period 1.5 to 2.5 inches of liquid water equivalent blanketed the area. Snow levels lowered to about 4700 feet above sea level on the 6th when up to 5 inches of snow was reported at Idaho Falls and seven inches at Soda Springs. A significant spike can be seen for precipitation in October (Figure 2.4). Total precipitation for the water year was well above the mean even without this season ending event (Figure 2.5).

Westerly winds brought several storm systems off the Pacific through the month of June. This helped maintain cloud cover and below normal temperatures and resulted in an extremely low Keetch-Byram Drought Index; a measure of short term drought; i.e., evapotranspiration and near surface soil moisture content (Figure 2.6a). The Index increased slowly to a moderate value near 400 the first week of September, but mainly in the lower elevations of the Snake Plain (Figure 2.6b).

The Palmer Drought Severity Index measures more long term meteorological conditions over several months. Near the peak of fire season, the Palmer Index (Figure 2.7) shows very moist conditions in the Caribou-Targhee National Forest, Southern Sawtooth National Forest, the middle Snake River Valley and Upper Snake Plain. For the Salmon-Challis National Forest, the Palmer value is much more in the "mid-range", and probably reflects the below normal precipitation observed by SNOTEL sites in the Big Wood and Salmon Basins during January and February.

Compared to the past 12 years of Red Flag Event verification, thunderstorm activity was above average this year and judged to be significant (greater than 15% of aerial coverage) on 9 different days this fire season between late July and late September (Figure 2.8). Seven out of the nine days were characterized as “dry” thunderstorms producing less than .10 inch rainfall. Cooler and wetter than normal weather conditions resulted in a much later start to the fire season. For Red Flag purposes, the fuels in Idaho Fire Weather Zones 409 and 412 were not designated as critical until August 15th and 16th, respectively. Fuel conditions in zones 475 and 476 were determined to be critical August 24th. The remaining zones 410, 411, 413 and 477 were not declared critical until later on in September.

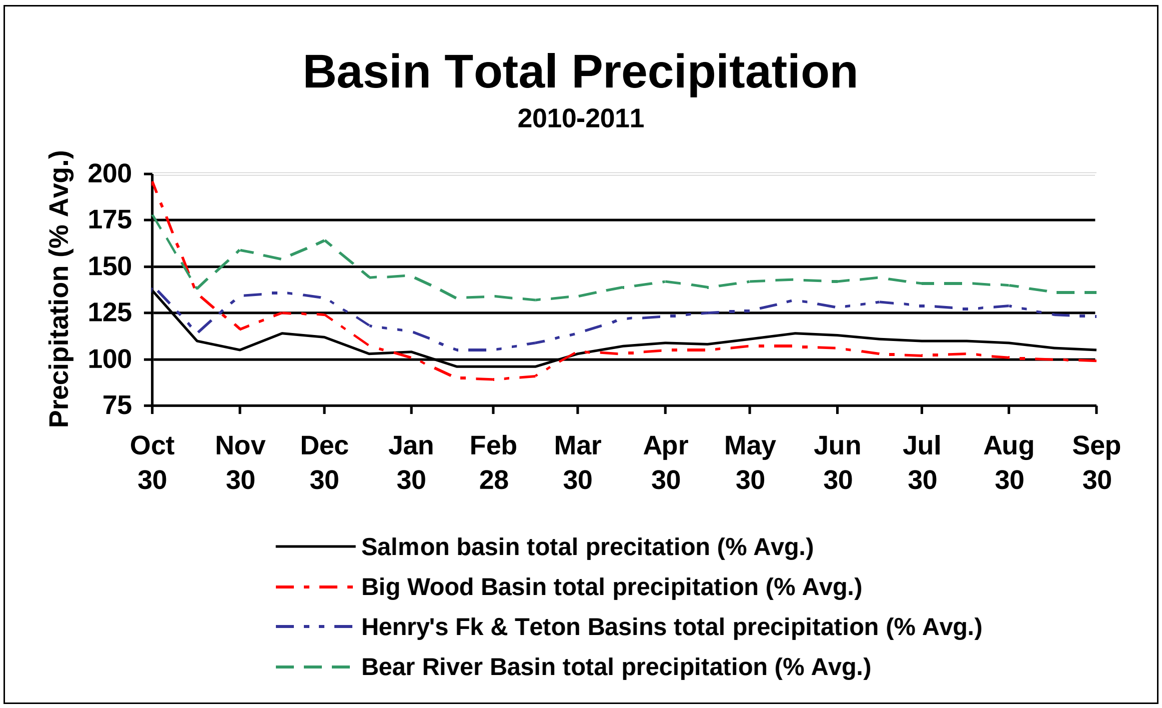

Figure 2.1(a) Total precipitation for select Southeast Idaho Basins expressed as a percent of average. From USDA Natural Resources Conservation Service, National Water and Climate Center, Portland Oregon.

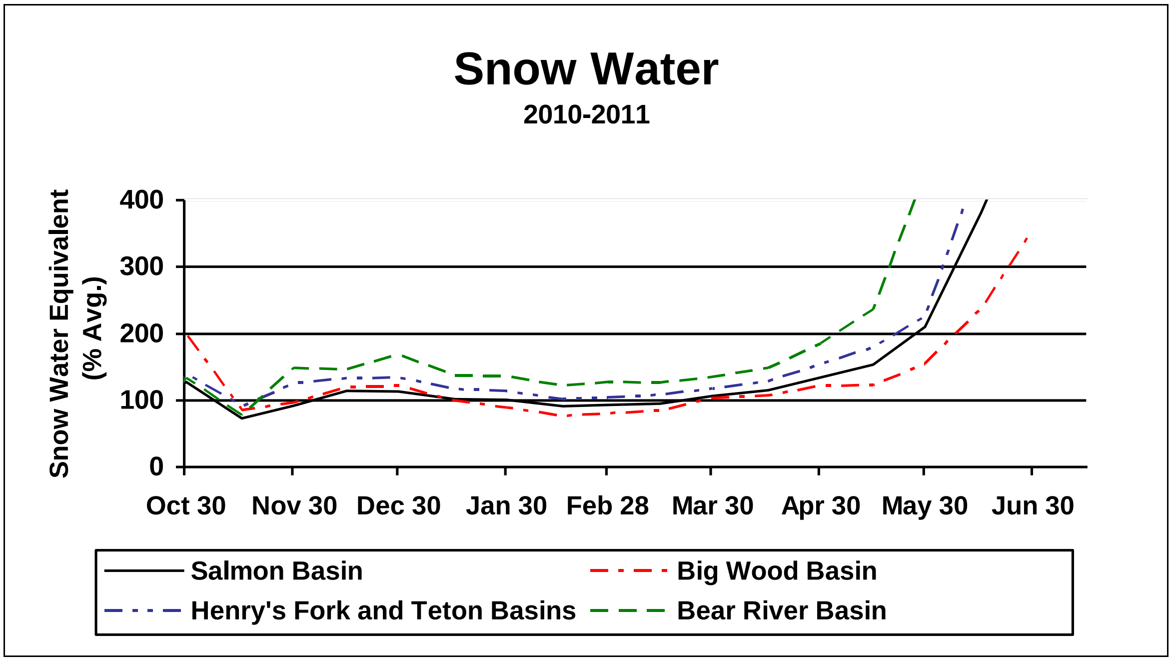

Figure 2.1(b) Snow water equivalent for select Southeast Idaho basins. From USDA Natural Resources Conservation Service, National Water and Climate Center, Portland Oregon.

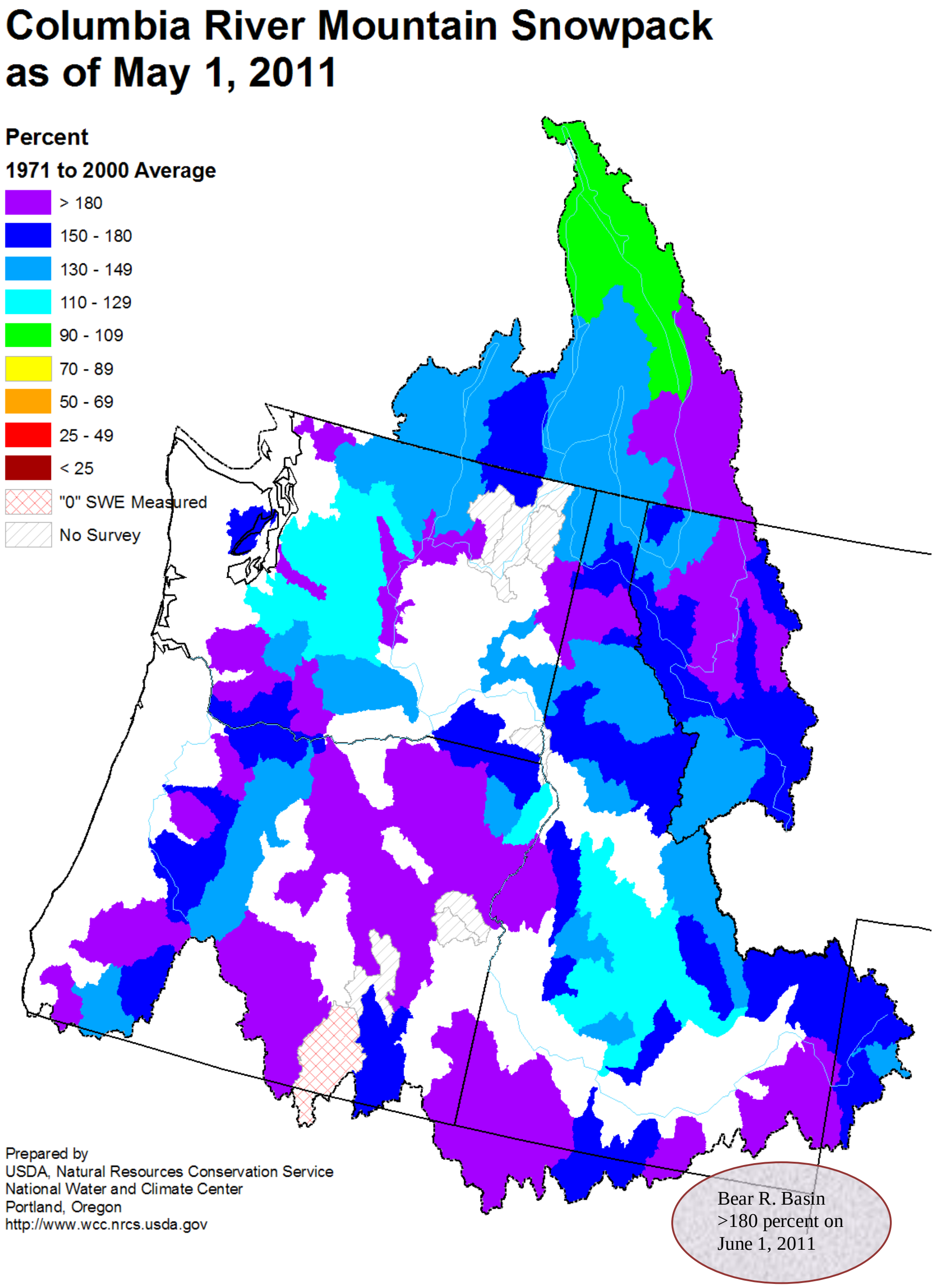

Figure 2.1c Mountain snow packs as determined from snow water equivalent. From USDA Natural Resources Conservation Service, National Water and Climate Center, Portland Oregon.

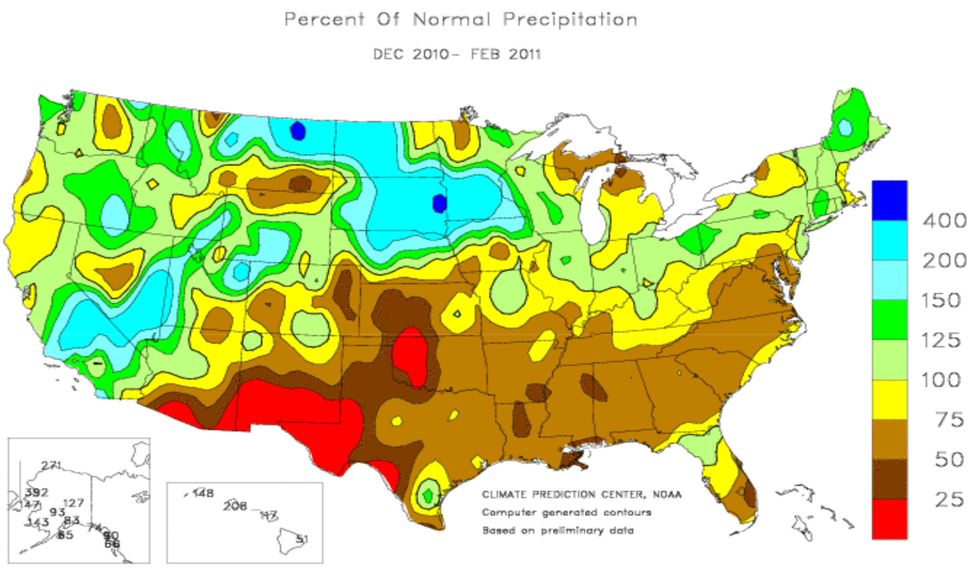

Figure 2.2a Precipitation as a percentage of normal for a 90 day period centered on January 2011, from Climate Prediction Center, National Oceanic and Atmospheric Administration.

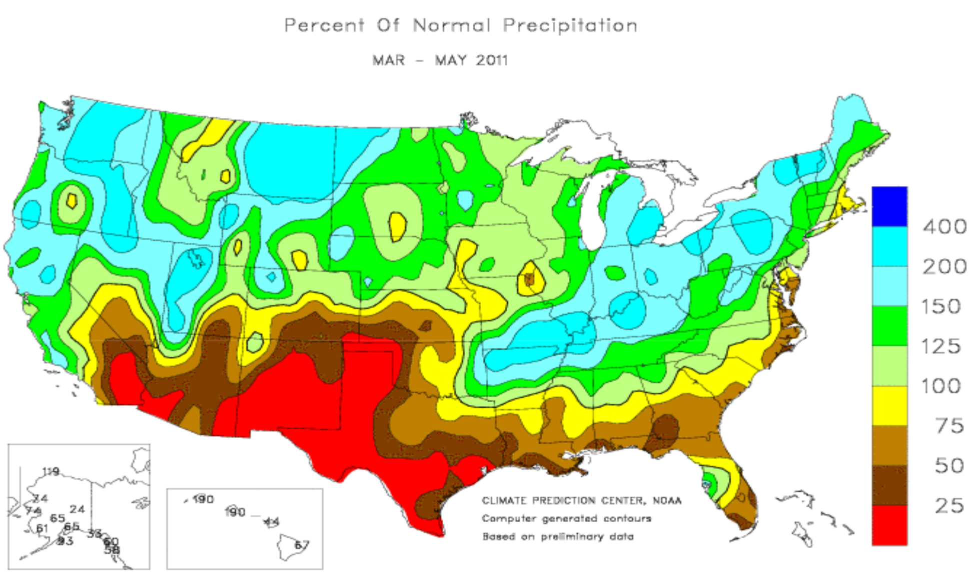

Figure 2.2b Precipitation as a percentage of normal for a 90 day period centered on April 2011, from Climate Prediction Center, National Oceanic and Atmospheric Administration.

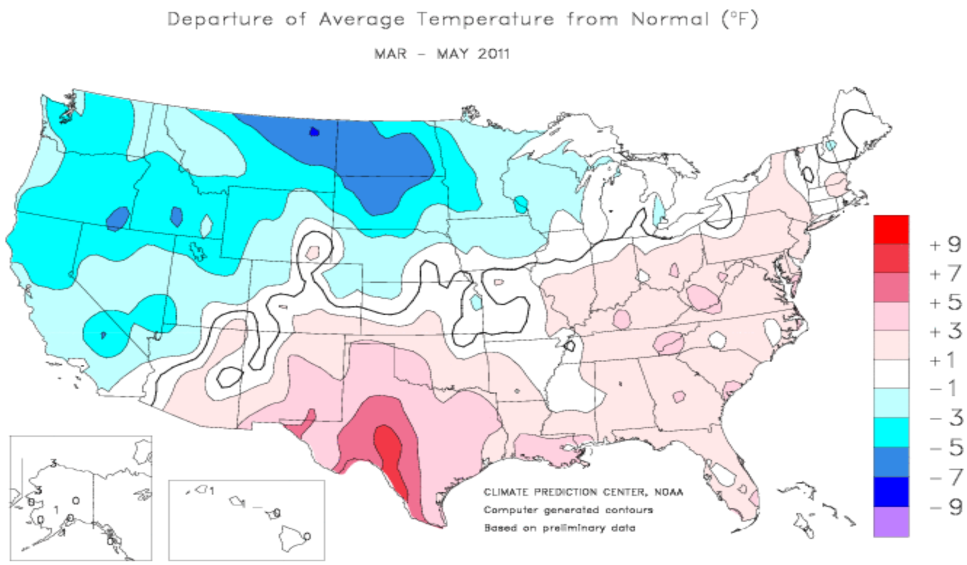

Figure 2.2c Temperature departure from normal for a 90 day period centered on April 2011, from Climate Prediction Center, National Oceanic and Atmospheric Administration.

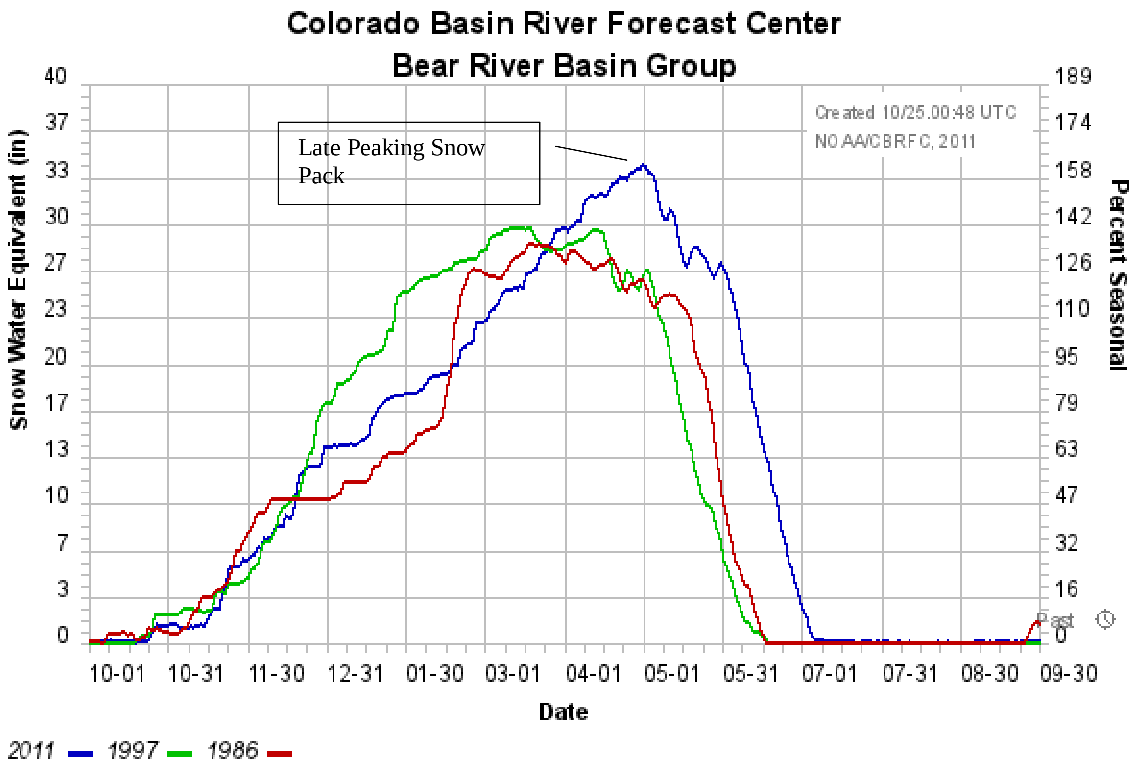

Figure 2.3 Late peaking snow packs of 2011 compared with years of similar snow pack; from the National Weather Service, Colorado Basin River Forecast Center. Major spring flooding occurred on southeast Idaho Rivers in 1986 and 1997. Moderate flooding was observed in 2011.

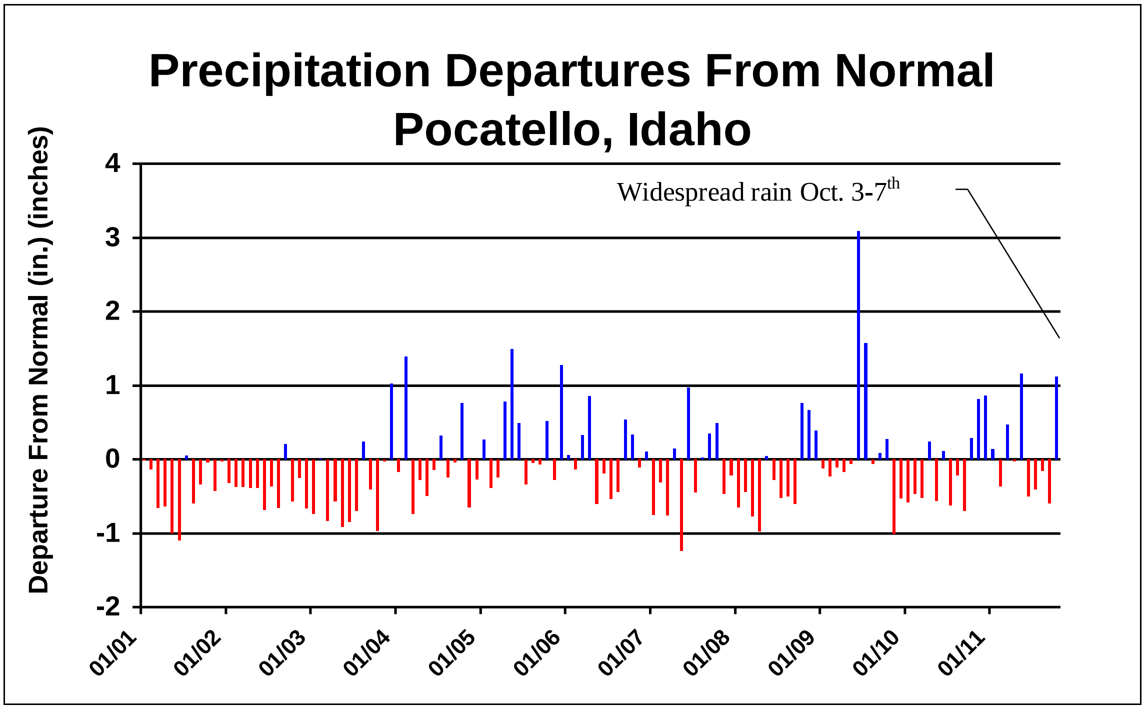

Figure 2.4 Precipitation departures from normal at Pocatello, Idaho based on thirty-year normals of data from 1971 to 2000 archived at the National Climatic Data Center.

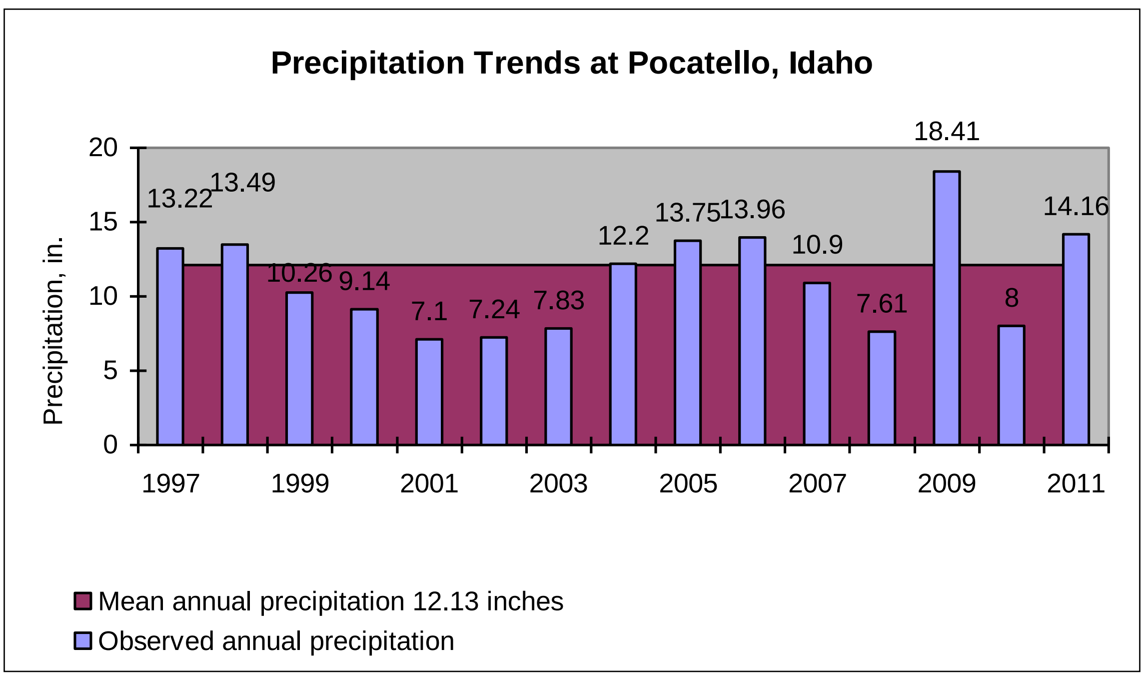

Figure 2.5 Water year (Oct. 1 to Sep. 30) observed precipitation at Pocatello, Idaho. Mean annual precipitation from National Climatic Data Center 1981-2010 monthly normals (previous 1971-2000 mean annual was 12.58 inches and for 1961-1990 12.14 inches).

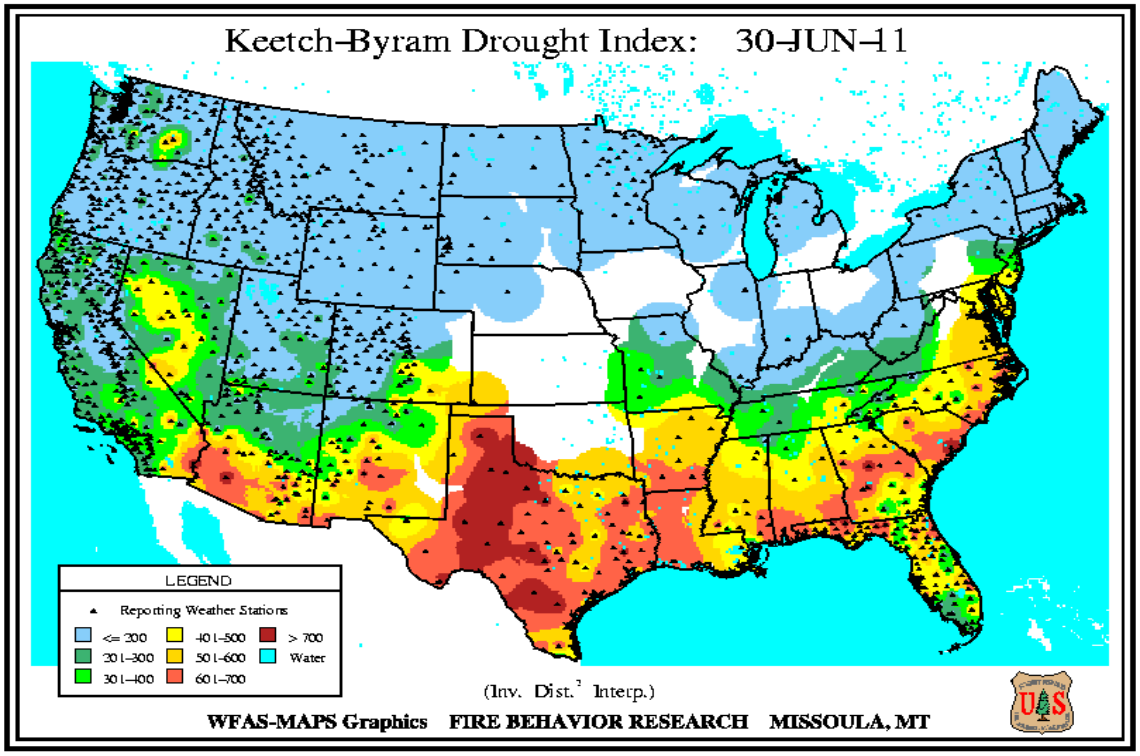

Figure 2.6(a) Keetch-Byram Drought Index reflecting more short term drought conditions, i.e. evapotransporation and near surface soil moisture. Valid June 30, 2011.

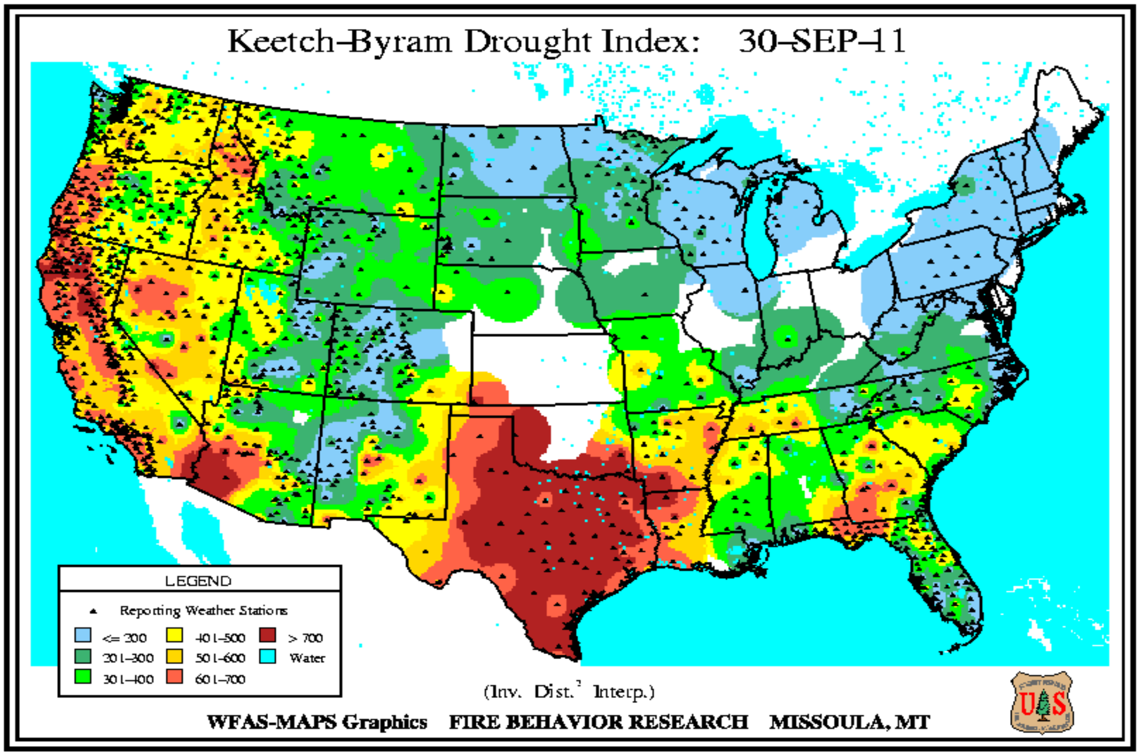

Figure 2.6(b) Keetch-Byram Drought Index reflecting more short term drought conditions, i.e. evapotransporation and near surface soil moisture. Valid September 30, 2011.

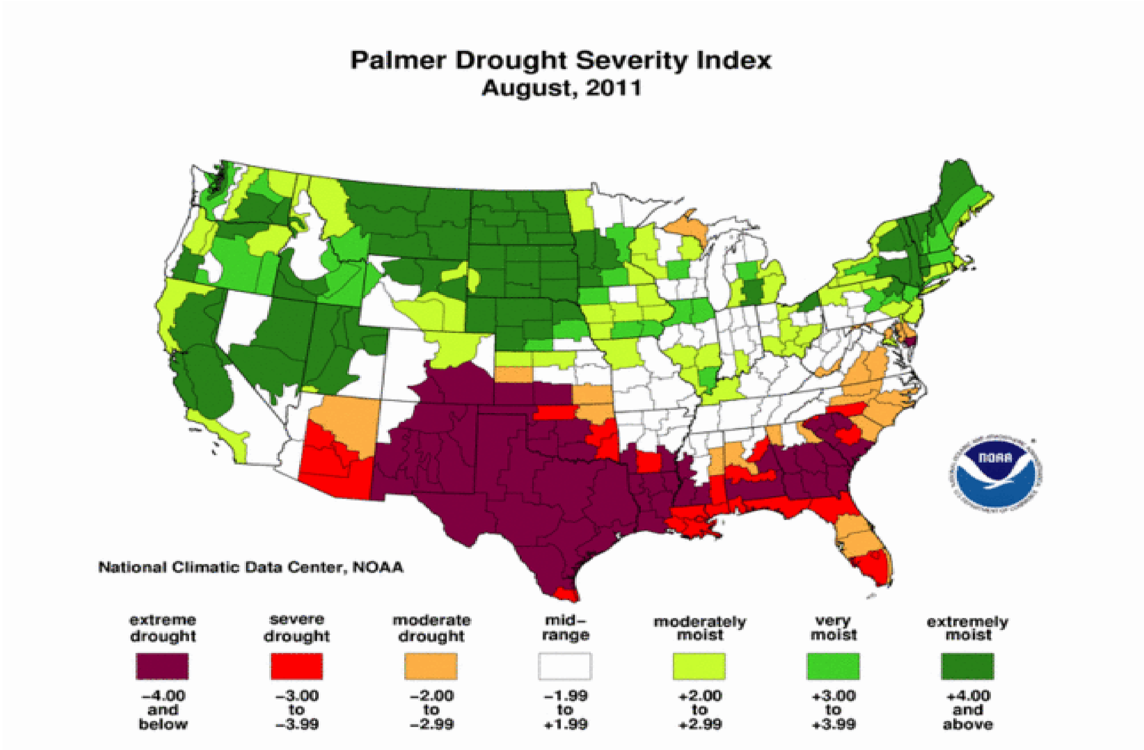

Figure 2.7 Palmer Drought Severity Index (August 2011) measuring long term meteorological conditions over many months.

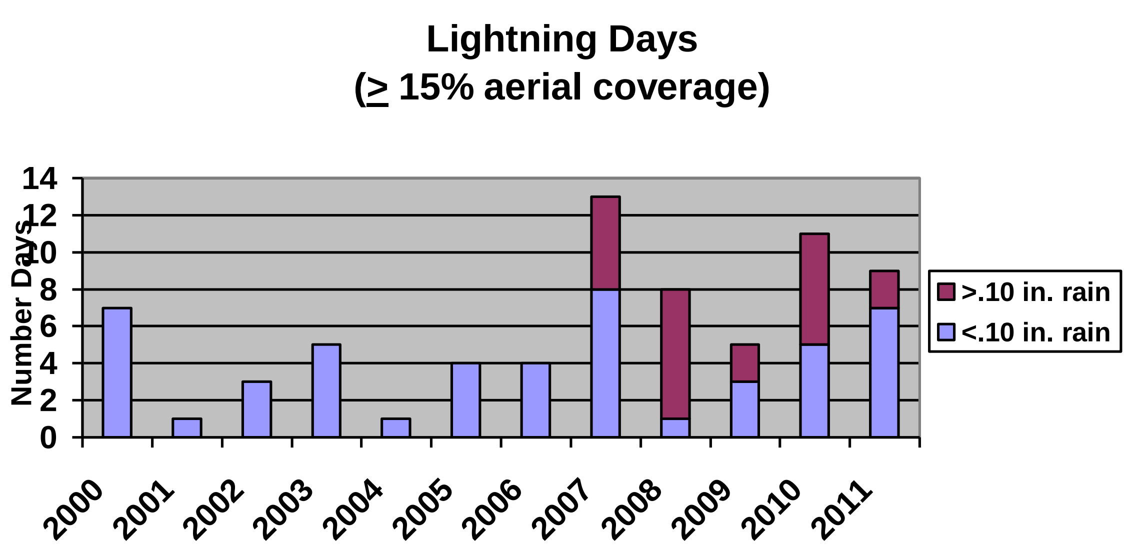

Figure 2.8 Number of days when thunderstorm and lightning activity in Southeast Idaho was judged to be significant as part of the Red Flag Event verification process. Prior to 2007 only days where thunderstorms were characterized as "dry" (<.10 inch rain) are indicated.

3. Weather in review: October 2010 – September 2011

October to early November 2010: A strong high pressure ridge over the Great Basin October 1st through the 3rd brought record high temperatures in the upper 80s to lower 90s to southeast Idaho; record high temperatures were set at Pocatello, Idaho Falls, Burley, and Stanley. Two events helped bring the fire season to an end this year. The first week of October 4-8th a strong low pressure system developed near San Diego and tracked northeast through the Great Basin. Widespread rain developed across southeastern Idaho with many mountain areas receiving over one inch of precipitation. Snow accumulation was short lived with warm ground temperatures and snow levels around 8000 feet of elevation. October 23th through the 27th a very moist storm system approached from the Pacific Northwest. Up to two inches of precipitation was reported at some RAWS and SNOTEL sites. Stanley, Idaho reported record daily rain fall of 1.41 inches on the 24th. A weaker Pacific storm system followed October 30th through November 3rd.

Early November through December 2010. La Nina was in full swing with high pressure over the Gulf of Alaska and storm systems riding over the top of the ridge then dropping into Idaho. Storm systems were on a fast pace, moving through the district on November 15th -21st, November 23rd-25th, and November 27-29th. A broad low pressure trough over western Canada and the northeast Pacific slowly sagged south from December 1st through the 24th. Gradually, the heavier precipitation moved south of the state as well. Precipitation was observed at Pocatello on 13 days in November and 22 days in December. Record daily snow fall of 7 inches fell at the Pocatello airport on November 28th. All Idaho basins south of Salmon received above average snow during this time period, Bear River reported 149 percent of average. Stanley, Idaho reported 3.11 inches of precipitation for the month of December, or 1.08 inches above normal.

January 2011 to February 2011. The effects of the Artic Oscillation changing from negative to positive phase began to play on the La Nina winter. High pressure over the Gulf of Alaska shifted towards the Aleutians Islands letting storm systems in north to northwest flow brush the Gulf waters and pick up moisture on the way to Idaho. Monthly mean temperatures were 2 to 6 degrees below normal. Storm systems affecting southeast Idaho continued on a quick pace for most of January with disturbances passing on 9-10th, 13-14th, 16-19th, 21-22nd, and 24-25th. There was a short reprieve from the stormy pattern in early February, followed with increased activity the last half of the month. The Idaho central mountains including the Wood River Valley, and the Big and Little Lost River Valleys received the lightest precipitation, however the Salmon-Challis and northern Sawtooth Forests retained a 90-100 percent of average snow pack. The northwest flow favored upslope terrain effects on the southeast side of the Snake Plain and Pocatello received another 7 inches of snow on February 24th and 25th.

March and April 2011. Low pressure was persistent over the Gulf of Alaska with westerly winds off the Pacific across Oregon to Idaho. The persistent flow continued to tap moisture rich air off the ocean bringing it inland in surges. Precipitation was observed in southeast Idaho at least 40 out of 60 days. Despite an ongoing seasonal warming trend, mean temperatures over southeast Idaho remained up to 6 degrees below normal. Temperatures warmed enough for mixed rain and snow in the lower valleys. The central mountains made up any precipitation deficit that may have existed and several mountain SNOTEL sites set records. Snow packs for all basins were at 100 to 140 percent of average, nearly matching that of 1997 when widespread spring flooding occurred in southeast Idaho. The White Elephant SNOTEL site above the Henry's Fork set a new record for the month of April at 11.3 inches of liquid water equivalent.

May 2011 and June 2011. The wet pattern continued through the third week of June and temperatures remained 3 to 5 degrees below normal across southeast Idaho. The cool period finally broke the last week of June. The National Weather Service Office at the Pocatello Regional Airport reported 2.67 inches of precipitation, or 1.51 inches of precipitation above normal for the month of May. The situation was stacking up for some good spring flooding on local rivers and streams. A significant difference noted between the situation in 1997 and this year was the late peak in snow water equivalent owing to the cool temperatures and continuing periods of precipitation. In most years, peak snow water occurs the first or second week of April and by May 1st of this year, SNOTEL data indicated many locations still had not peaked. The Portneuf River at Pocatello reached flood stage May 8th; the Snake River at Blackfoot, Shelley and Heise, and the Henry's Fork River at Rexburg and St. Anthony followed with flooding over the next two weeks. Periodic flooding occurred on the Teton River near St. Anthony the latter half of June. Additional rain showers and thunderstorms brought the threat of flash flooding as well. Significant flooding of small streams and lowland areas from Island Park to Bear Lake and Minidoka became problematic. By July 1st flooding had ended.

July 2011. Soil moisture was high and the green-up period for fuels was on a slower track this year. Wild fire activity was slow but there were a couple incidents in the Salmon-Challis NF area with the Indian and Mill Fires, also Pine Knob and Cottonwood Cave near Oakley, Idaho. The Southwest Area Monsoon tried to get off to an early start with northward surges of gulf moisture July 5-6th and 11-13th. Each time the monsoon surged north, a Pacific low pressure disturbance crossing Idaho shunted the monsoon moisture off to the east and southeast of the state helping to keep temperatures and relative humidity moderated. Thunderstorms that did develop during this time tended to produce wetting rains of .10 inch or more.

August 2011 through September 2011. Monsoon moisture surged northward to Idaho the first week of August, only to be pushed east of the state by a low pressure disturbance off the Pacific by August 7th. The monsoon moisture surged north again on August 17th and the 21-23rd. Thunderstorms with these events produced less than .10 inch of rain. The last week of August and the first week of September, strong high pressure became established near the Four Corners area. This lead to several non-consecutive days where the high level Haines Index reached a value of 6 in southeast Idaho and probably was a factor in some ongoing wild fires. This pattern was broken up with the passage of a cold front through the Pacific Northwest on September 1st and 2nd. The monsoon attempted to make a final surge north September 12-14th with limited success, but disturbances embedded in westerlies off the Pacific prevailed.

October 2011. The first major storm system of the fall occurred between October 4th and 7th when a Pacific storm brought widespread rain and snow to southeast Idaho. Over the four day period from 1.5 to 2.5 inches of liquid water equivalent blanketed the area. Snow levels lowered to about 4700 feet on the 6th when up to 5 inches of snow was reported at Idaho Falls and seven inches at Soda Springs. Afternoon high temperatures following this even were about 15 degrees Fahrenheit cooler and relative humidity remained generally above 30 percent.

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4. Precipitation and Dry 1000 hour fuels by zone:

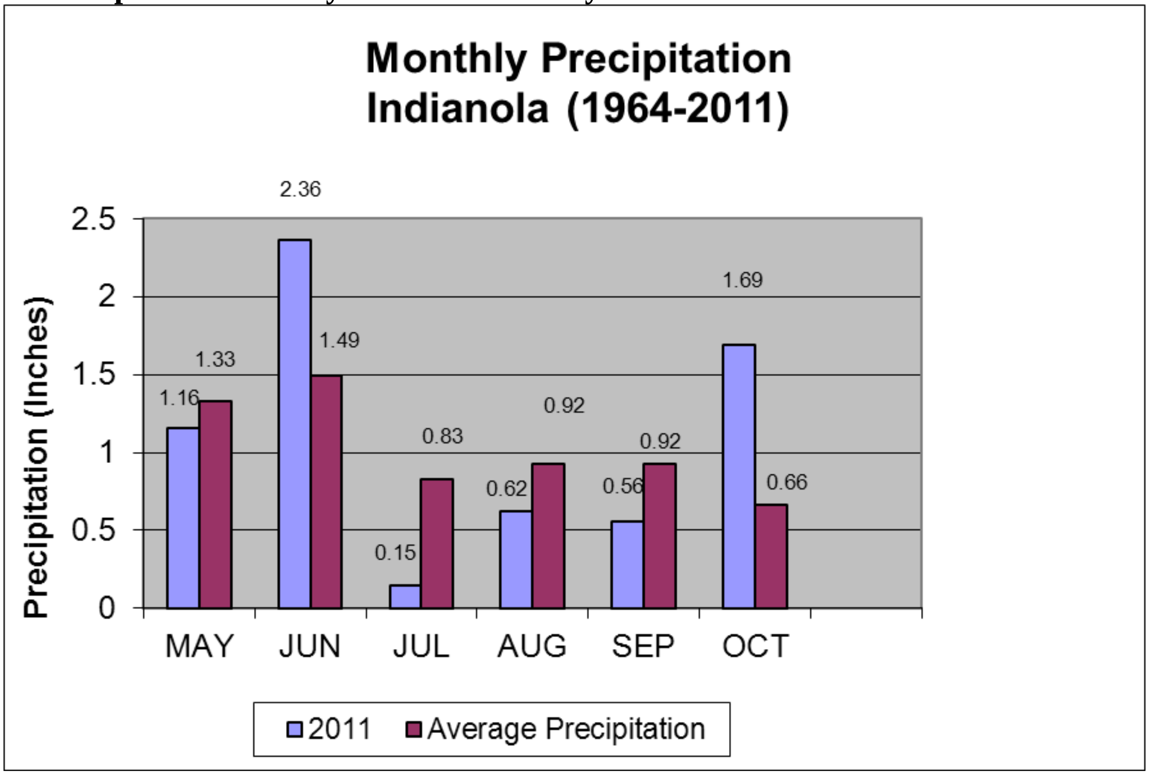

Figure 4.1(a) Observed and average precipitation at Indianola RAWS site, Fire Weather Zone 475.

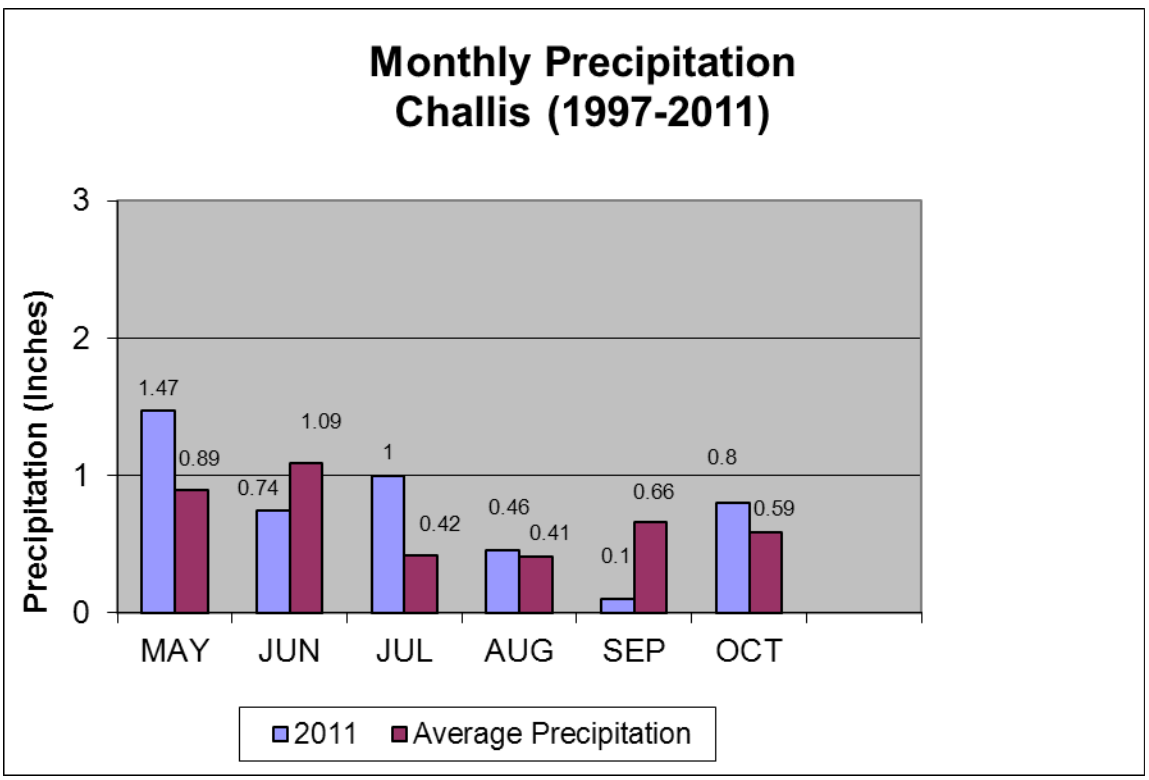

Figure 4.1(b) Observed and average precipitation at Challis RAWS site, Fire Weather Zone 476.

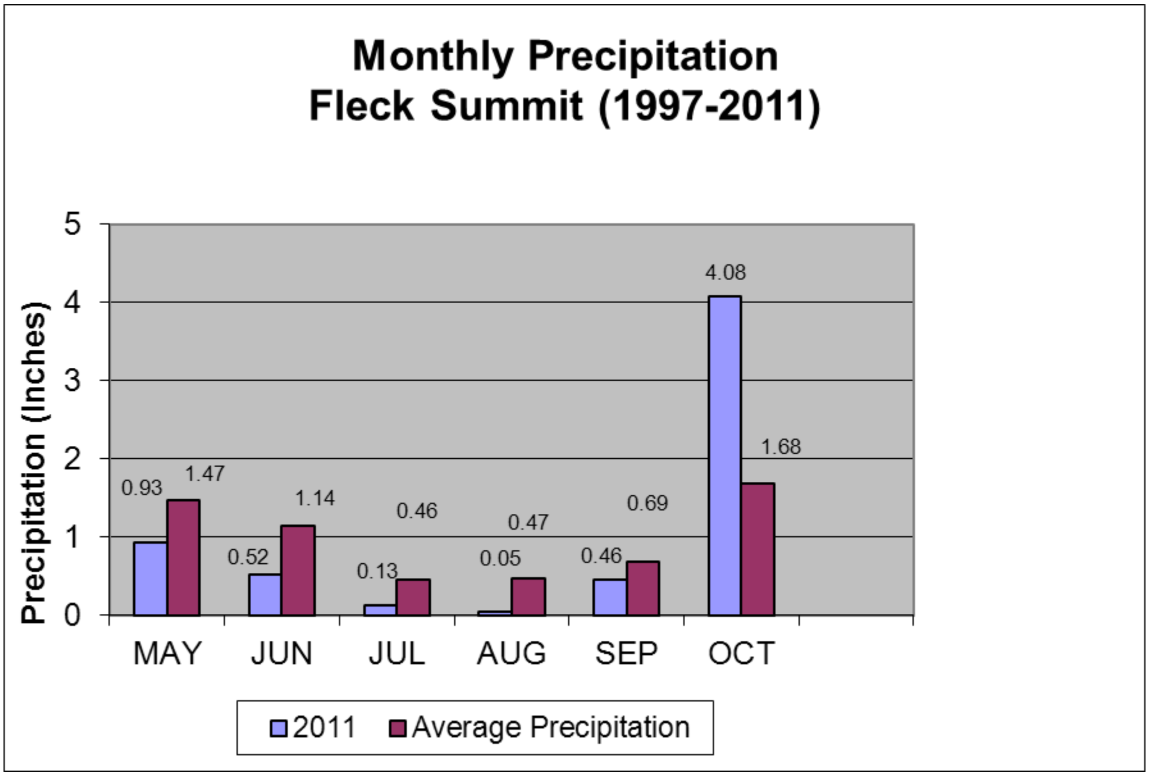

Figure 4.1(c) Observed and average precipitation at Fleck Summit RAWS site, Fire Weather Zone 477.

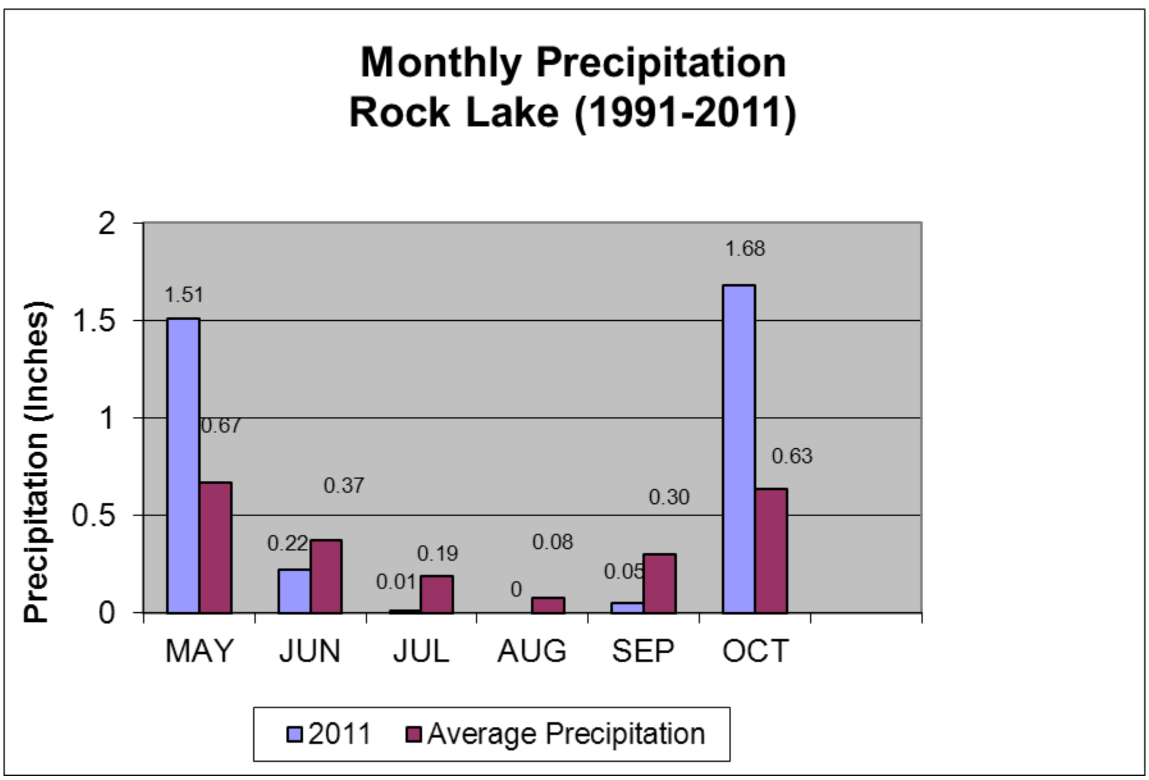

Figure 4.1(d) Observed and average precipitation at Rock Lake RAWS site, Fire Weather Zone 409.

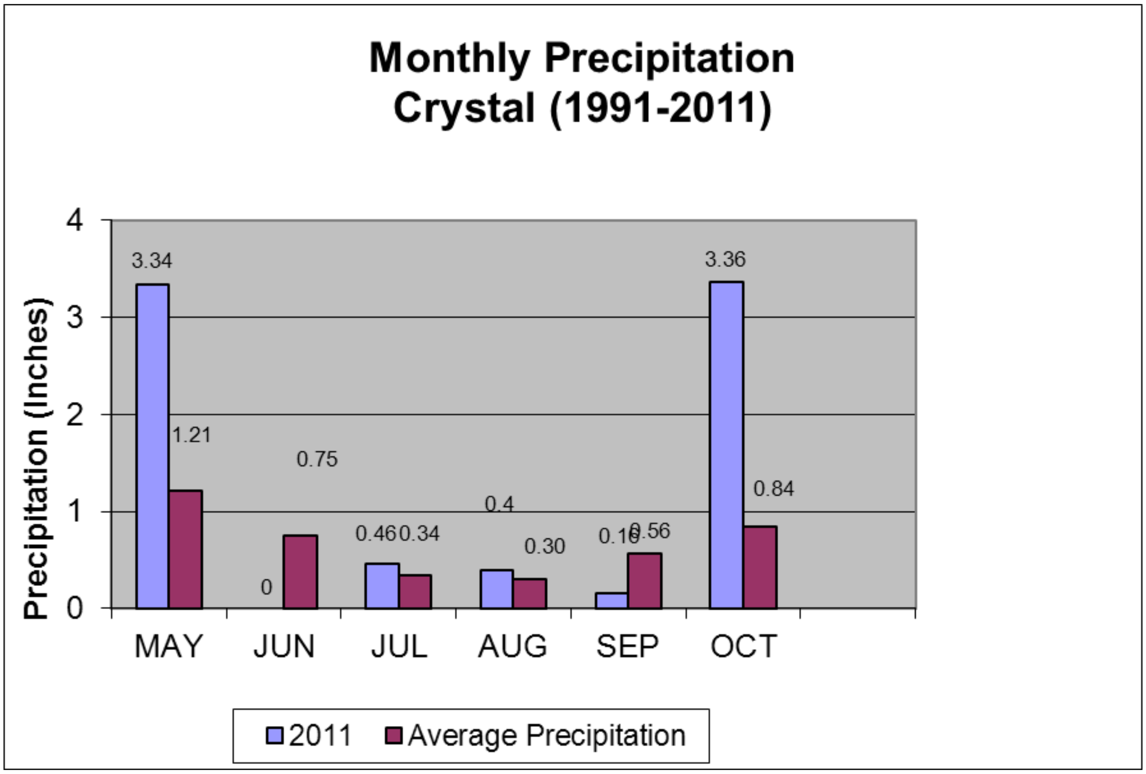

Figure 4.1(e) Observed and average precipitation at Crystal RAWS site, Fire Weather Zone 410.

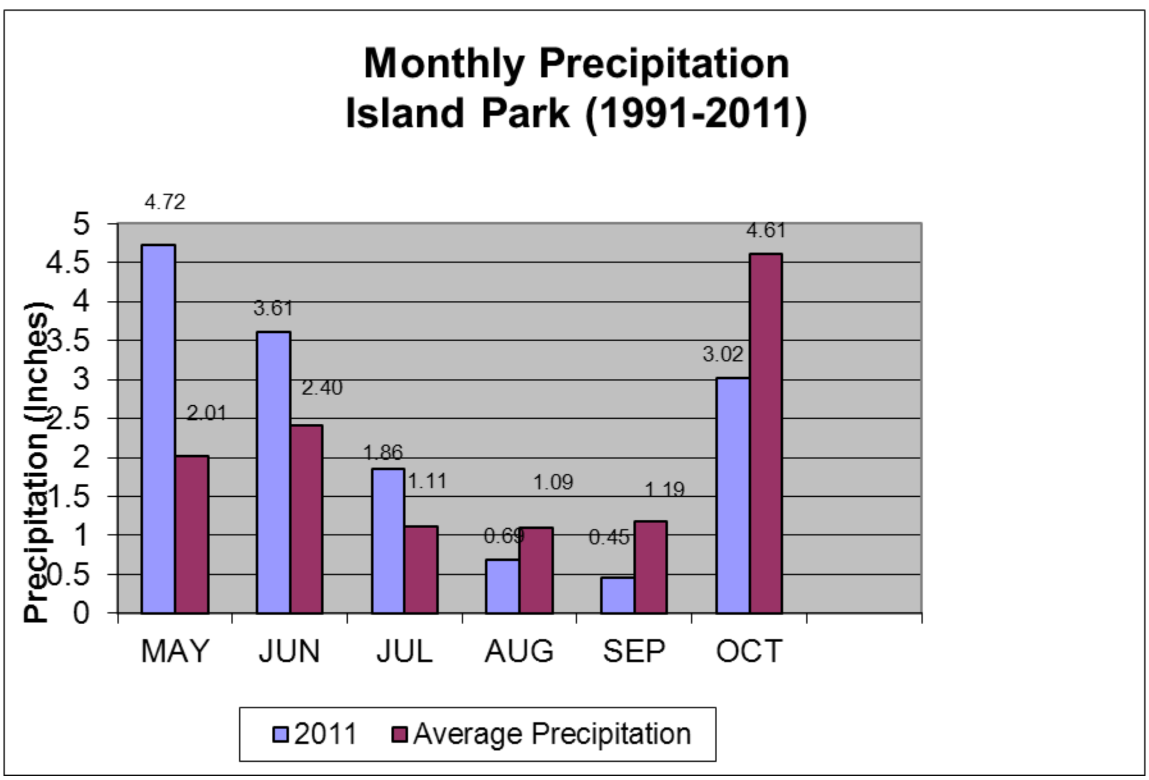

Figure 4.1(f) Observed and average precipitation at Island Park RAWS site, Fire Weather Zone 411.

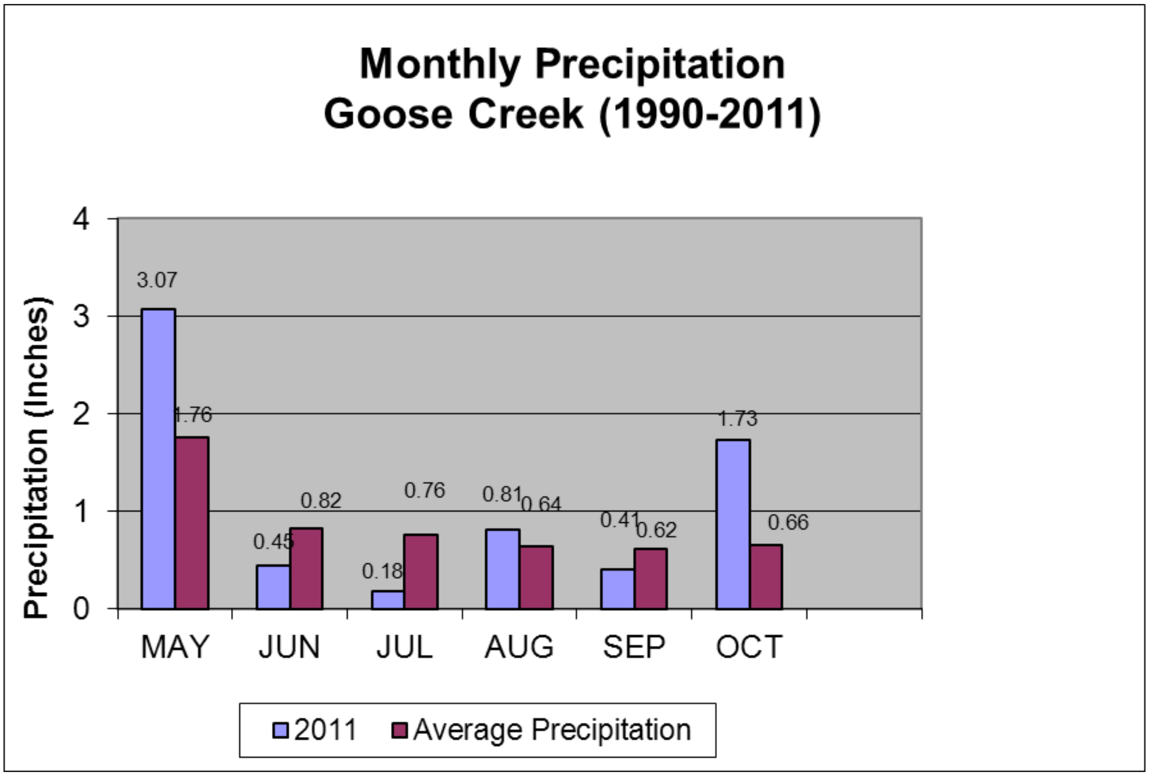

Figure 4.1(g) Observed and average precipitation at Goose Creek RAWS site, Fire Weather Zone 412.

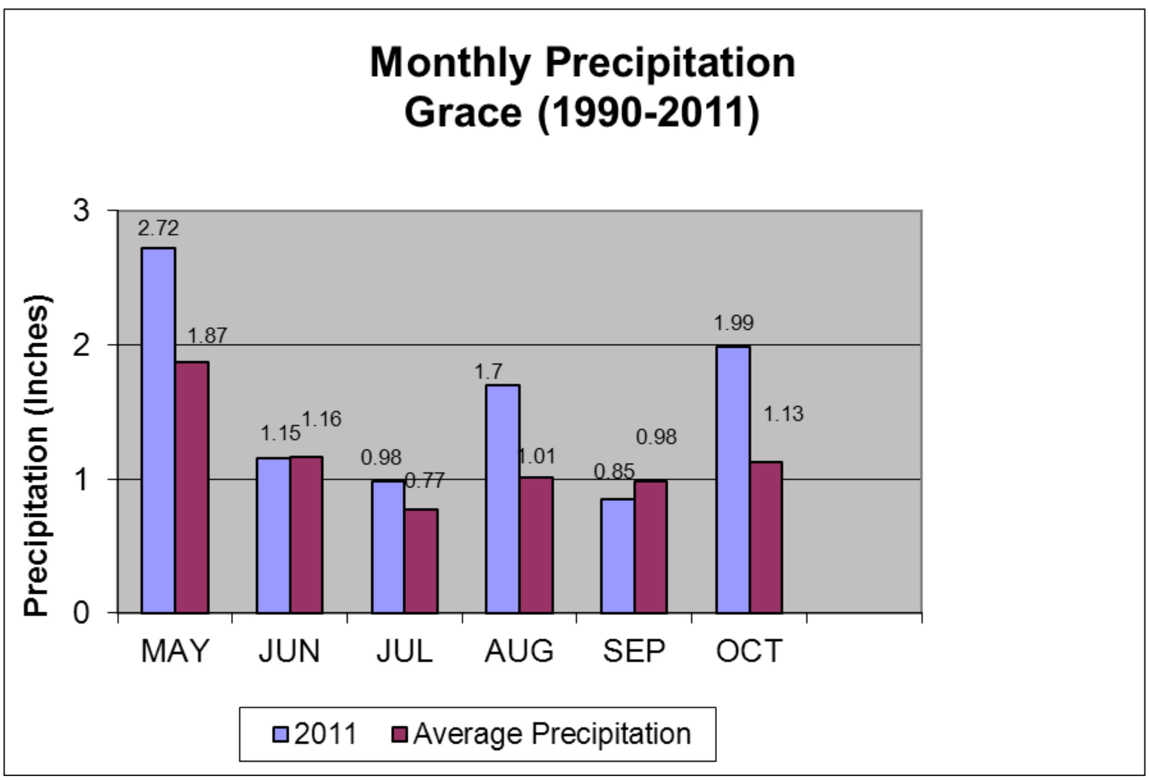

Figure 4.1(h) Observed and average precipitation at Grace RAWS site, Fire Weather Zone 413.

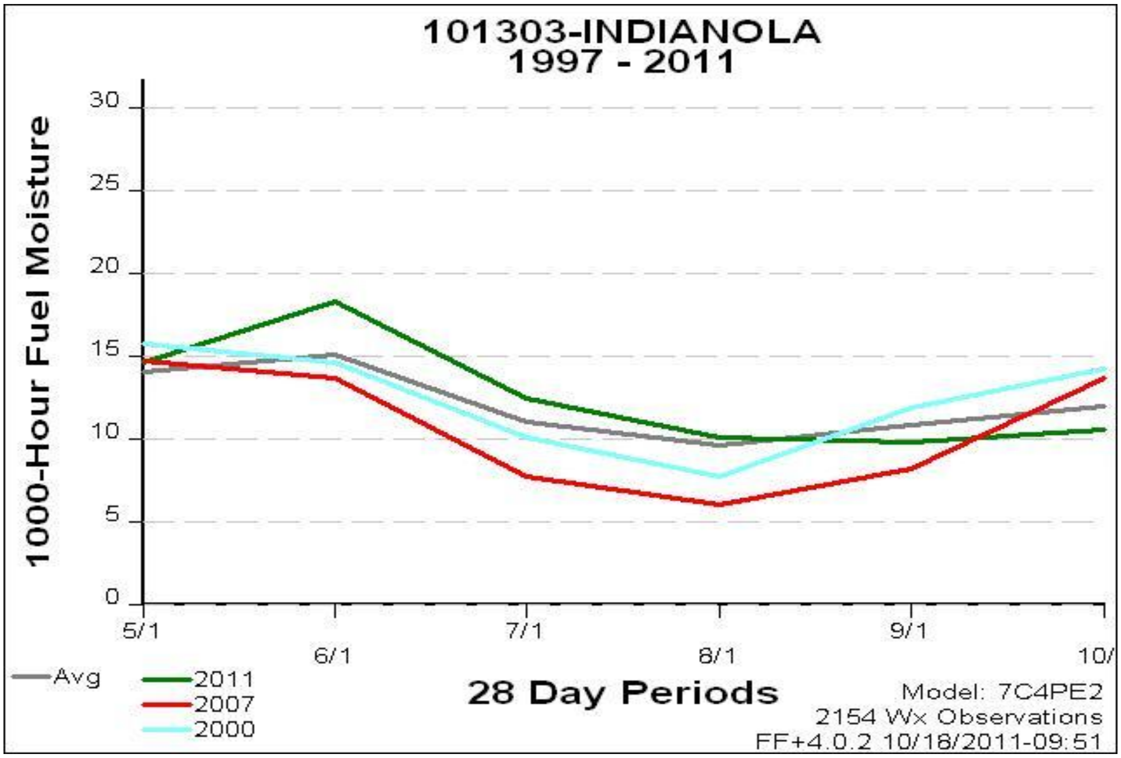

Figure 4.2(a) Observed and average 1000 Hour Fuel Moisture at Indianola RAWS site, Fire Weather Zone 475.

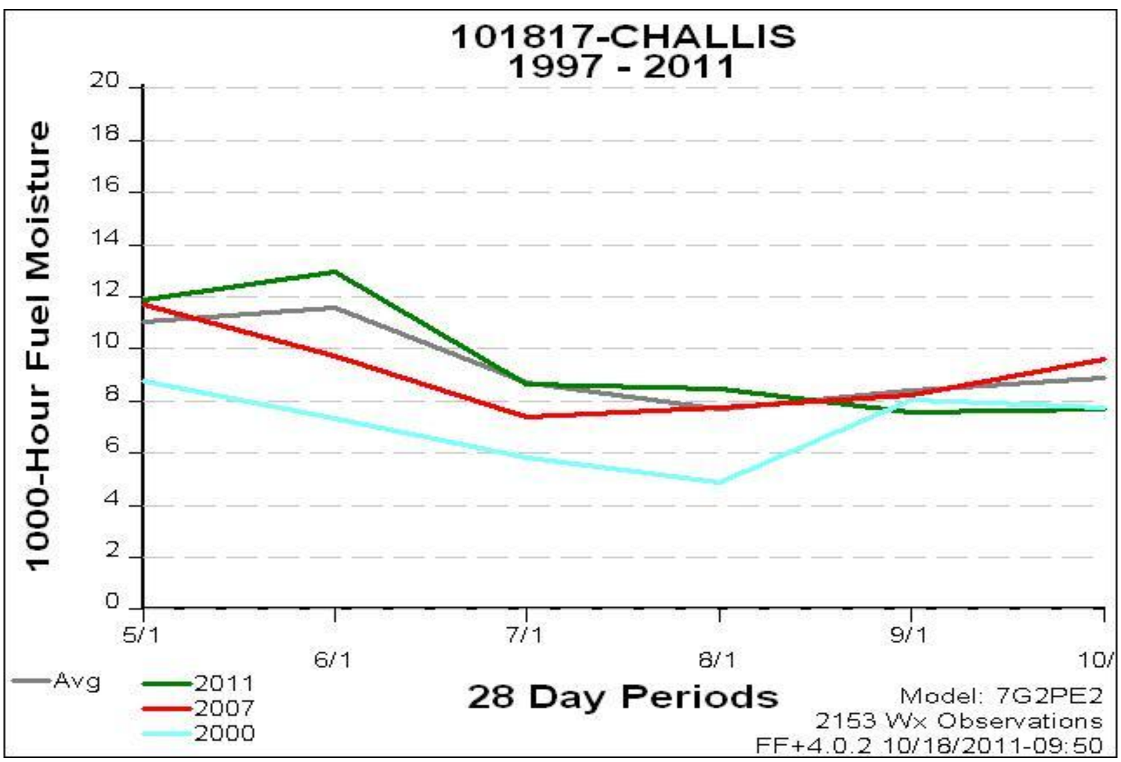

Figure 4.2(b) Observed and average 1000 Fuel Moisture at Challis RAWS site, Fire Weather Zone 476.

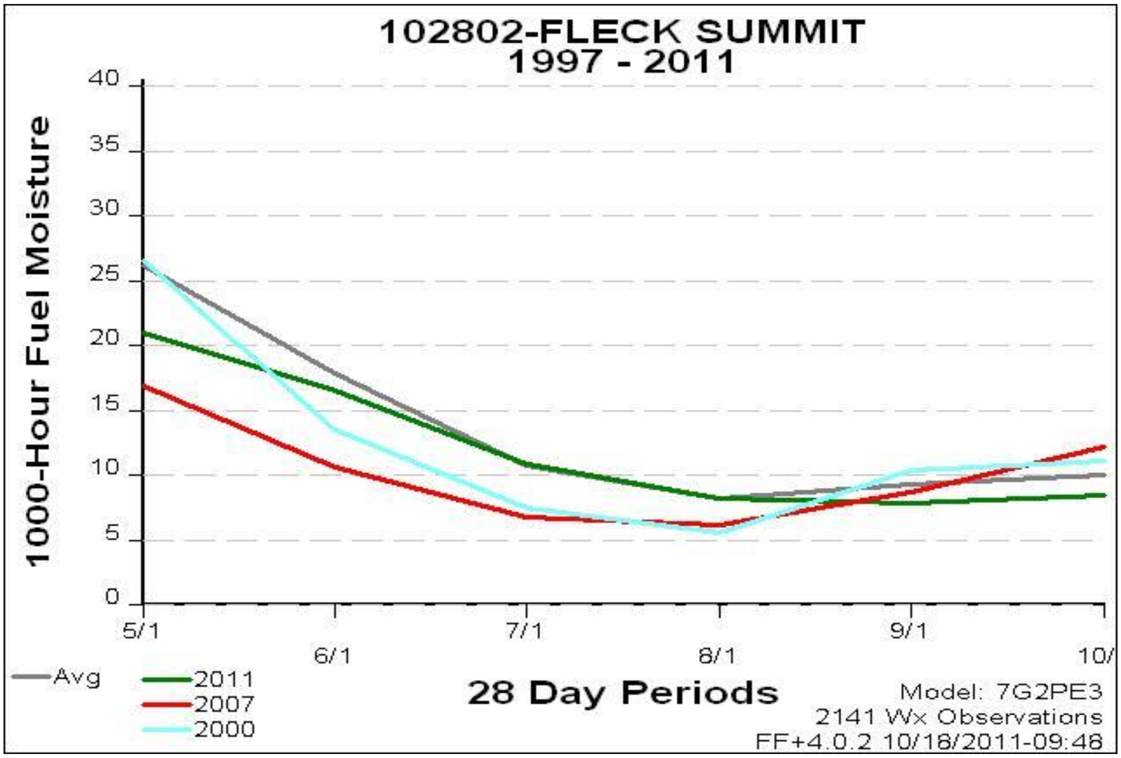

Figure 4.2(c) Observed and average 1000 Fuel Moisture at Fleck Summit RAWS site, Fire Weather Zone 477.

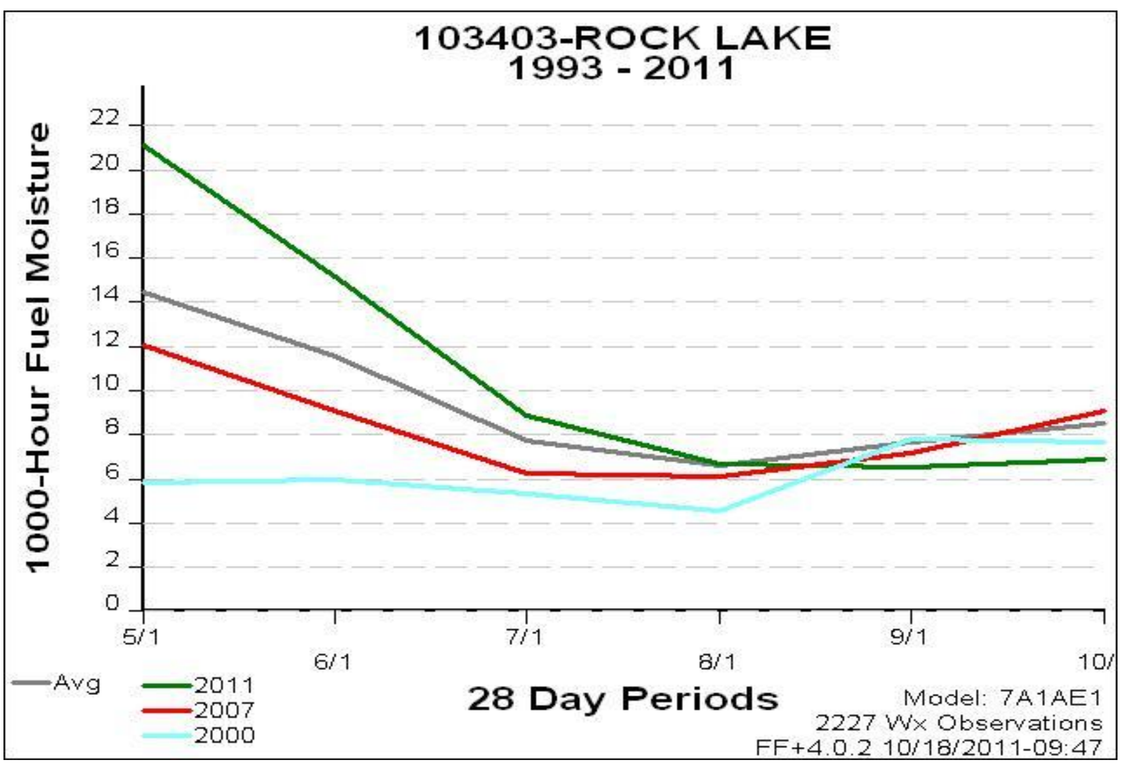

Figure 4.2(d) Observed and average 1000 Hour Fuel Moisture at Rock Lake RAWS site, Fire Weather Zone 409.

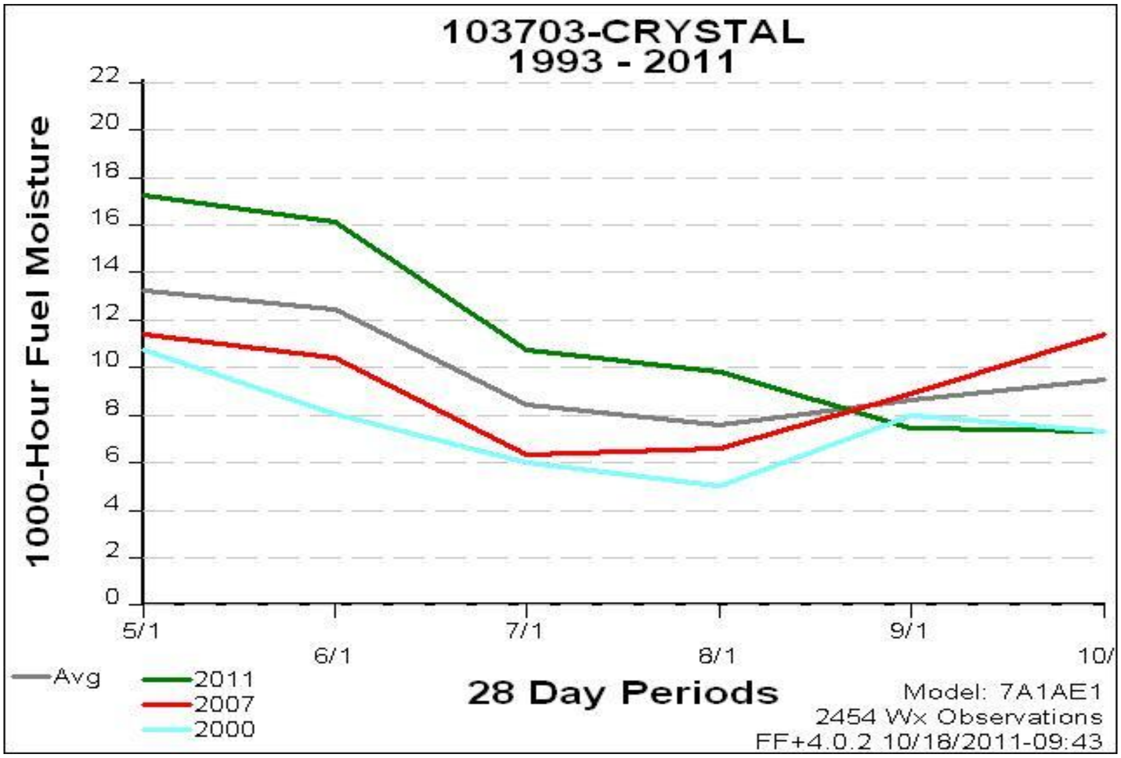

Figure 4.2(e) Observed and average 1000 Hour Fuel Moisture at Crystal RAWS site, Fire Weather Zone 410.

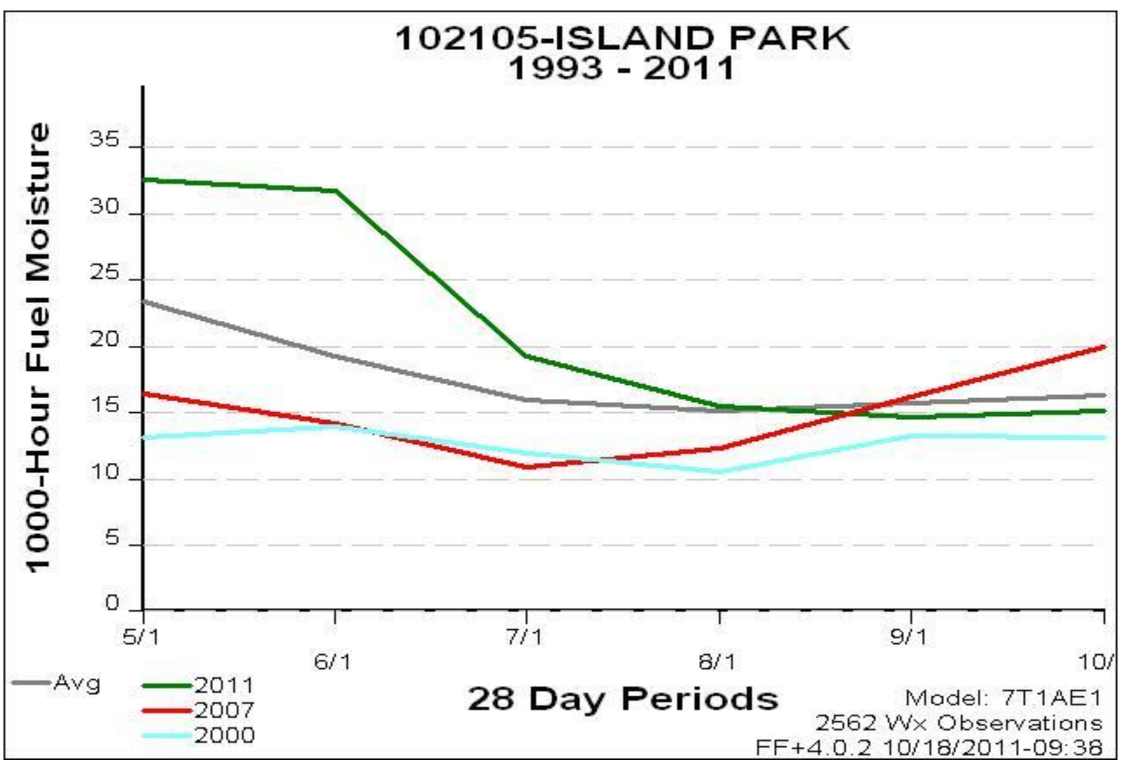

Figure 4.2(f) Observed and average 1000 Hour Fuel Moisture at Island Park RAWS site, Fire Weather Zone 411.

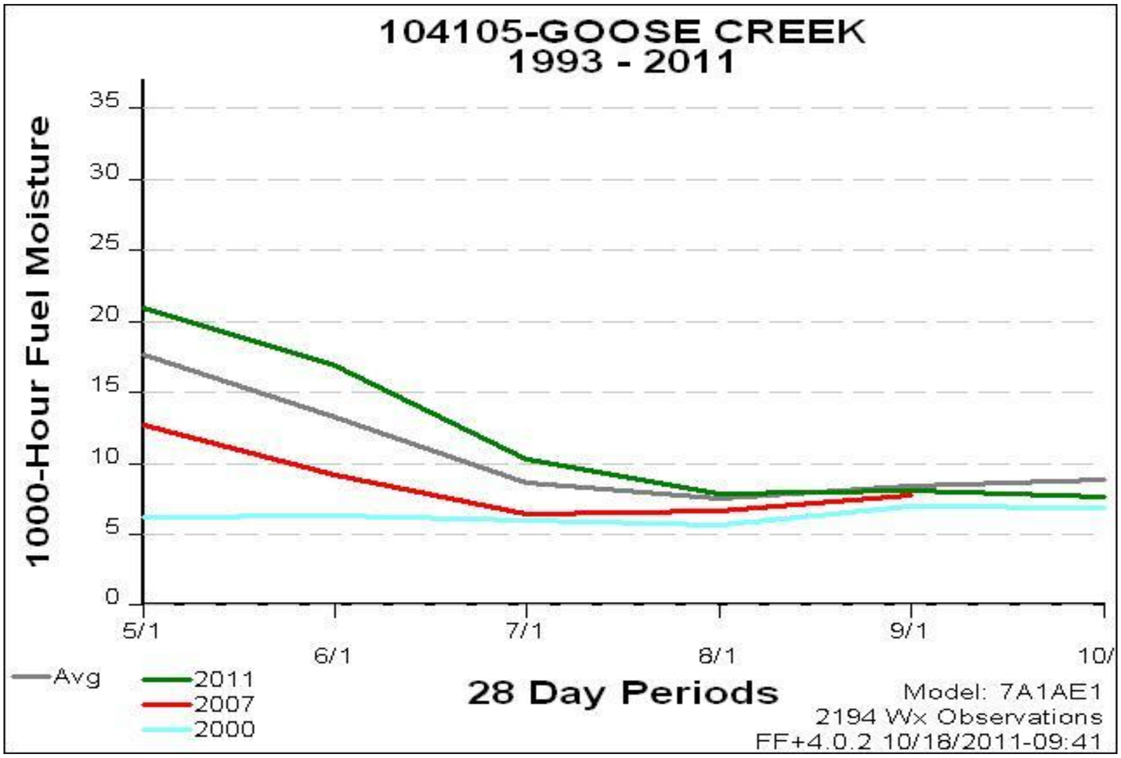

Figure 4.2(g) Observed and average 1000 Hour Fuel Moisture at Goose Creek RAWS site, Fire Weather Zone 412.

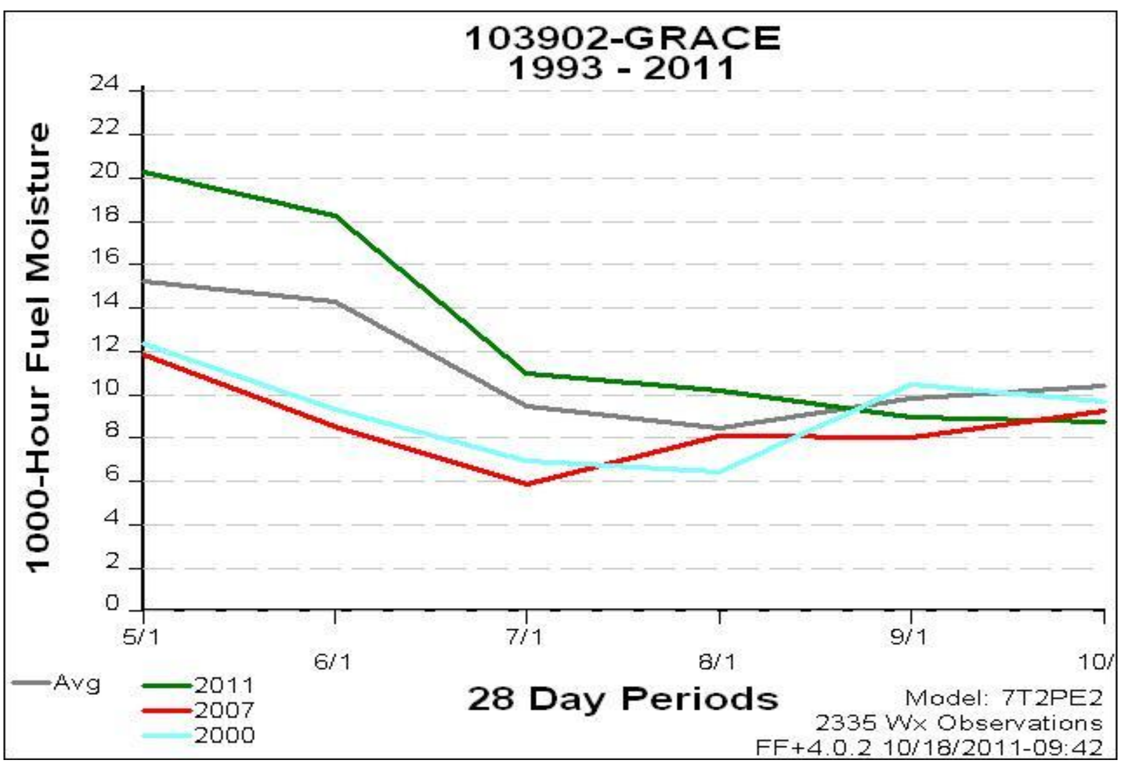

Figure 4.2(h) Observed and average 1000 Hour Fuel Moisture at Grace RAWS site, Fire Weather Zone 413.

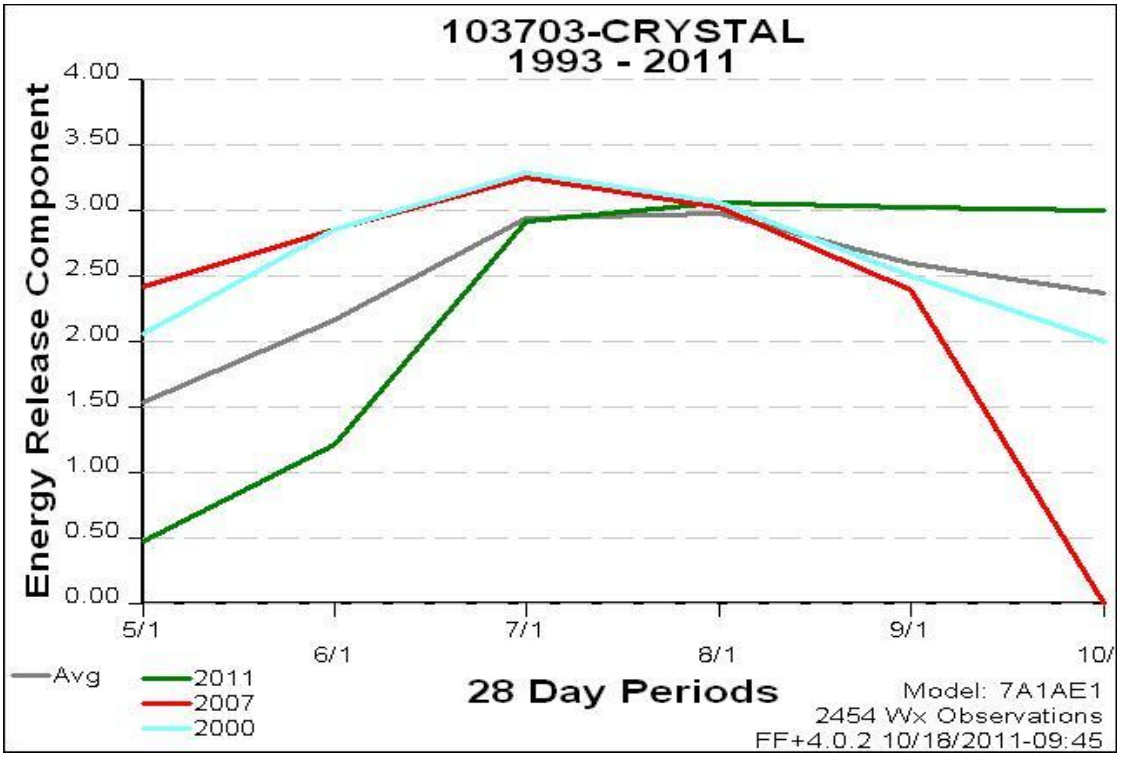

Figure 4.3 Calculated Energy Release Component at Crystal RAWS site, Fire Weather Zone 410.

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5. Office Operations:

5.1 Red Flag Verification

1. Formal verification of Red Flag Warnings in Southeast Idaho began with the 2000 fire season and is now a permanent part of the fire weather program. Verification is based on current Red Flag Warning and Fire Weather Watch criteria that has been coordinated with local land management agencies and published in the Great Basin Annual Operating Plan for Fire Weather and Predictive Services. Current criteria for the Pocatello Fire Weather District are shown in paragraph 5.1.2 below.

Events considered “short fused” or having time lengths typically less than six hours (Dry Lightning) were split out from other events occurring over a longer time period, reference tables 5.1 (a-d) below.

2. Conditions that indicate a Red Flag Event:

Fire Weather Watches and Red Flag Warnings, are issued for conditions of very high or extreme fire danger (as determined by land management agencies) and dry fuels, in combination with one of the following:

a. Widely scattered or greater ($\geq$ 15% of aerial coverage) thunderstorm activity.

b. Winds gusts for any three or more hours $\geq$ 25 mph for Southeast Idaho Mountains, $\geq$ 30 mph for the Snake River Plain and relative humidity is $\leq$ 15 percent.

c. In the judgment of the forecaster, weather conditions will create a critical fire control situation. These conditions may include strong microburst winds, passage of a cold front or a strong wind shift.

Red Flag criteria are developed from a local knowledge of fuel types, terrain, weather conditions common or unusual to the area, historical fire behavior, and judgment of the local land management agencies. Because the criteria for issuing Red Flag products can vary from one district to another, these verification results are not necessarily comparable with other forecast offices.

3. Methodology:

Verification of Red Flag Warnings was conducted on a zone by zone basis. Example: If a warning for strong wind was issued for fire weather zones 409 and 410, but strong winds were observed only in zone 410, then this counts as two warnings, one that verified and one false alarm. Also, if strong winds were observed in zone 412, but no warning was issued, then this would be counted as one missed event.

Sources of verification included Remote Automated Weather Stations (RAWS), Meteorological Reporting Stations (METAR), lightning data; WSR-88D Doppler Weather Radar estimated precipitation, volunteer weather spotter information such as heavy rain events, and reports of observed fire behavior from personnel in the field.

Local MESONET reporting networks maintained by Idaho Department of Transportation and the Idaho National Laboratory were not used as a source of verification for wind events since there are differences in observing standards at these sites.

Statistical parameters were calculated as follows:

Probability of Detection	POD = a/(a+c)
Critical Success Index	CSI = a/(a+b+c)
False Alarm Rate	FAR = 1-[a/(a+b)]

where

a = the number of correct warnings (verified)
b = the number of incorrect warnings (not verified)
c = the number of events not warned

4. Sources of error:

Red Flag criteria for wind events in the Great Basin were modified based on interagency agreement set forth in the Great Basin Fire Weather Operating Plan for 2005 and continue without change for the 2006 and 2007 fire seasons. Beginning with the 2008 fire season, the distinction between wet and dry thunderstorms was eliminated from the Red Flag criteria owing to concerns of lightning strikes and fire ignition occurring outside the main thunderstorm rain shaft. A thunderstorm was previously considered “dry” if it produced little or no precipitation (< 0.10 inch). The mid-point of a forecast range serves as the break point for watch/warning issuance. This effectively adds an element of representativeness to the verification process. Therefore, any inference of trends from verification results must consider changes made to the established criteria for a Red Flag Event and verification procedures in past years. The Red Flag Event criteria and verification procedures also changed in 2002 and 2004. Please reference past issues of this Fire Weather Annual Report.

Forecaster skill level and confidence may be lower for peak wind gusts over sustained wind speed. Downward transport of momentum in the atmosphere, complex terrain, inversions of temperature lapse rate, variations in surface insolation owing to vegetative ground cover, reflectivity, absorption and transmissivity of the atmosphere, and the energy phase change of water in the atmosphere all impact the observed peak surface wind gust. Not all of these processes are sufficiently represented by available computer modeling and operational forecaster techniques.

Personal judgment was required to determine when lightning was more than an isolated event and significant in areal coverage.

Field observations of fire behavior may serve as an important indicator of Red Flag conditions. On rare occasion this may affect the best judgment of the forecaster and land management personnel. On days or in locations where there were no on-going fires this information was not available.

In paragraph 2c above, judgment of the forecaster and land management personnel is permitted to override the strict criteria of relative humidity and wind gusts. The general consensus is there is enough uncertainty in the fire environment (fuel, weather and topography) and this should remain a necessary and important element of the Red Flag criteria. This also requires a certain amount of judgment in the verification process.

Both RAWS and METAR stations report instantaneous wind gusts, but the observing standards for height of the wind sensor can vary.

On rare occasion the fuels were defined as critical at an elevation below that of existing RAWS and METAR stations.

Skill and lead-time vary with the type of event.

5. Decision Criteria

Wind – The number of available RAWS and METAR sites varied both with the area warned and location where fuels were defined as critical. Every attempt was made to judge the representativeness of wind conditions.

Lightning – Archived lightning data was used to determine verification. A good deal of judgment was needed to determine if the observed lightning was more than an isolated event. Some thunderstorms are more efficient lightning producers than others.

Wet versus dry thunderstorms – this element was removed from the Red Flag Criteria beginning with the 2008 fire season. The number of reported fire starts is not a reliable indicator since lightning strikes can occur outside the thunderstorm precipitation shield striking drier fuels and a single thunderstorm can be long lived producing numerous strikes over some distance.

Other – Reports of observed fire behavior from personnel in the field continue to be useful when dealing with long-term drought conditions and days of reported low relative humidity. If sustained fire runs are observed but available observations do not necessarily support warning criteria, the judgment would likely fall on the side of safety of life and property.

6. Results:

Red Flag Warning criteria were met on a total of 11 different days during this fire season in the Pocatello Fire Weather District. Strong gusty winds and low relative humidity were a factor on three of these days; thunderstorms and lightning activity were a significant factor on nine of these days. There were 3 days (events) when Red Flag Warning criteria were met somewhere in the Pocatello Fire Weather District without a warning in effect.

	May	June	July	August	September	October	Total
Total # watches	0	0	0	2	10	0	12
Total # of warnings	0	0	0	13	18	5	36
Number warnings that were preceded by a watch	0	0	0	2	6	0	8
Warnings verified (a)	0	0	0	11	16	1	28
Warnings not verified (b)	0	0	0	2	2	4	8
Events not warned (c)	0	0	0	1	1	1	3

Table 5.1(a). Combined synoptic (long term) and short fused Red Flag event products issued in the WFO Pocatello Fire Weather District during the 2011 season.

	May	June	July	August	September	October	Total
Total # watches	0	0	0	0	2	0	2
Total # of warnings	0	0	0	0	6	4	10
Number warnings preceded by a watch	0	0	0	0	2	0	2
Warnings verified (a)	0	0	0	0	5	0	5
Warnings not verified (b)	0	0	0	0	1	4	5
Events not warned (c)	0	0	0	1	0	0	1

Table 5.1(b). Synoptic scale Red Flag event products issued in the WFO Pocatello Fire Weather District during the 2011 season. Example cold fronts, low relative humidity, strong pressure gradient related winds.

	May	June	July	August	September	October	Total
Total # of watches	0	0	0	2	8	0	10
Total # of warnings	0	0	0	13	12	1	26
Number warnings preceded by a watch	0	0	0	2	5	0	7
Warnings verified (a)	0	0	0	11	11	1	23
Warnings not verified (b)	0	0	0	2	1	0	3
Events not warned (c)	0	0	0	0	1	1	2

Table 5.1(c). Short fused Red Flag event products issued in the WFO Pocatello Fire Weather District during the 2011 season. Example: lightning events and strong micro burst winds.

Red Flag verification resulted in the following:

	Synoptic Events	Short Fused Events (Lightning)	All Events
Probability of detection POD =	0.83	0.92	0.90
Critical success index CSI =	0.45	0.82	0.72
False alarm rate FAR =	0.50	0.12	0.22
Average lead time for Warnings =	13 hrs. 31 min.	8 hrs. 42 min.	9 hrs. 38 min.

Table 5.1(d). Combined synoptic (long term) and short fused Red Flag event products issued in the WFO Pocatello Fire Weather District during the 2011 season.

7. Implications:

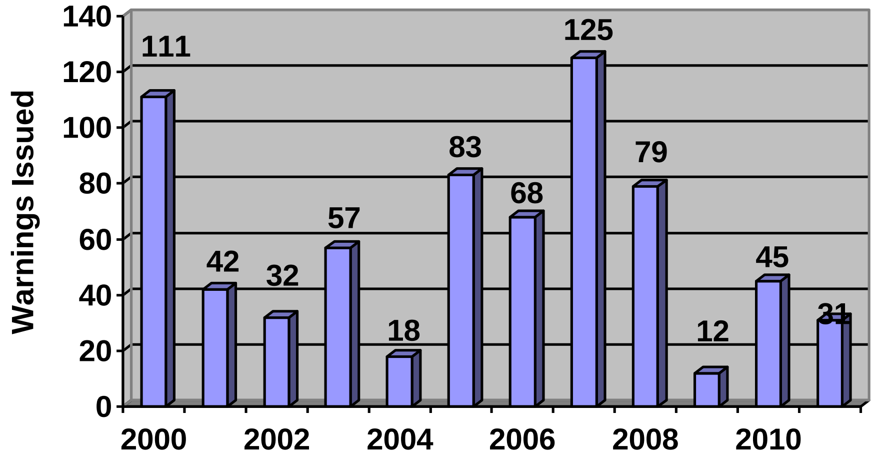

Figure 5.2 Historical Red Flag Warnings in Southeast Idaho; based on one warning per fire weather zone meeting criteria. In dry years the number of zones with “critical” fuels generally increases, and so does the number of warnings. The Red Flag criteria have changed several times since the 2000 fire season.

The 2011 fire season in Southeast Idaho got off to a late start owing to cloud cover, seasonably cool temperatures and well above normal rain fall into the first half of July. Local vegetation entered the “green-up” period later than normal followed by later than normal curing of local fuels. Lightning activity was judged to be significant on 9 days this season, compared to an average of 8 days since 2008 (Figure 2.8) and accounted for 25 of the 31 warnings (events) issued. There were two days when very pronounced smoke column development was observed on local wildfires in conjunction with a high level Haines Index of 6. The Weather Forecast Office in Pocatello achieved a probability of detection of 0.90 but this was offset by a false alarm rate of 0.22 this year.

5.2 Spot Forecasts prepared by WFO Pocatello:

Wildfires	206
Prescribed Fires	130
HAZMAT	0
Backup	0
Exercise	1
Search & Rescue	0
Total	337

Verbal Phone Briefings	
For fire support	67
Search & Rescue	0
Emergency management	2
Exercise	1
Total	70

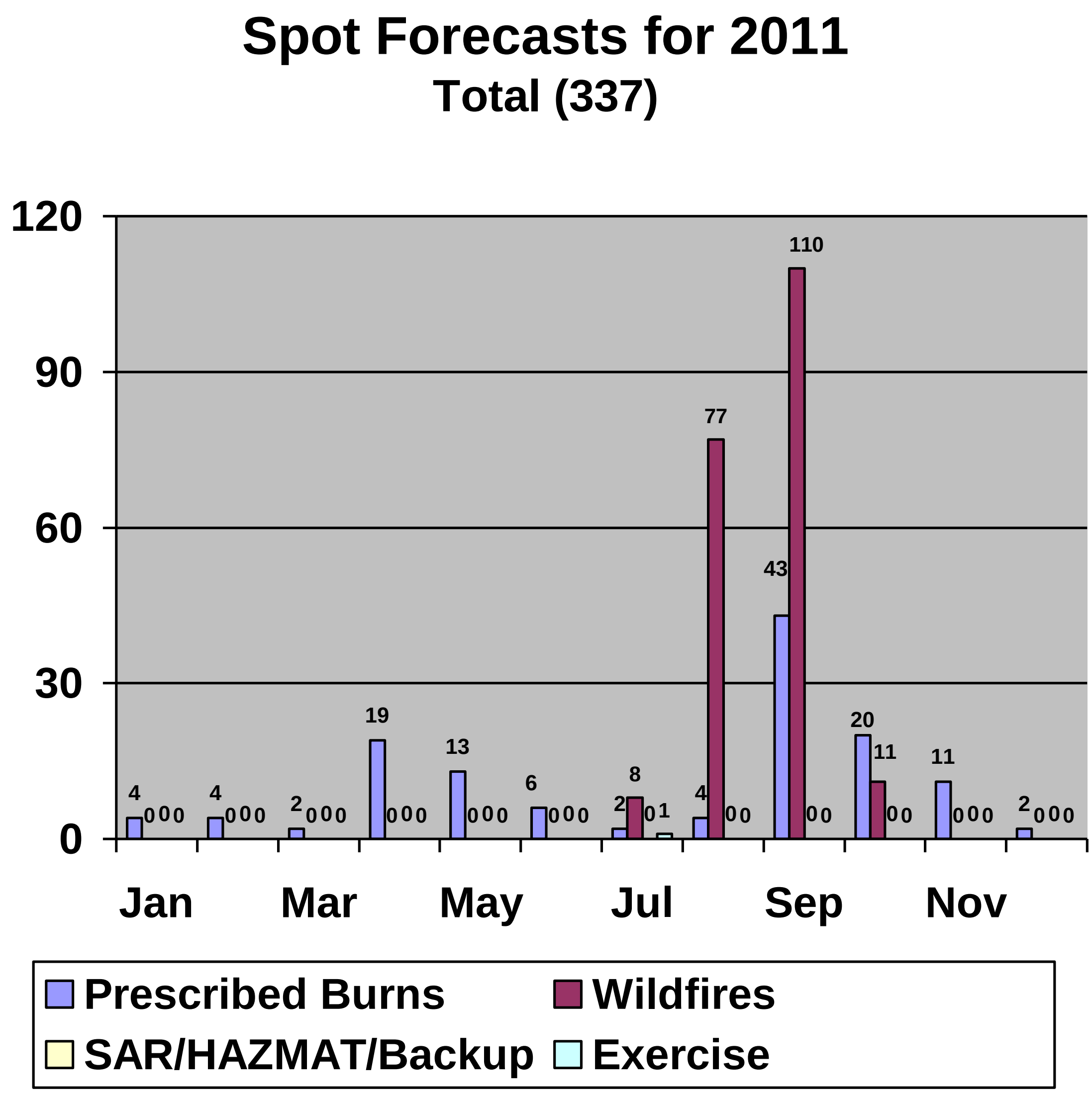

Figure 5.3(a) Spot Forecasts prepared by the Pocatello Fire Weather District during the 2011 fire season.

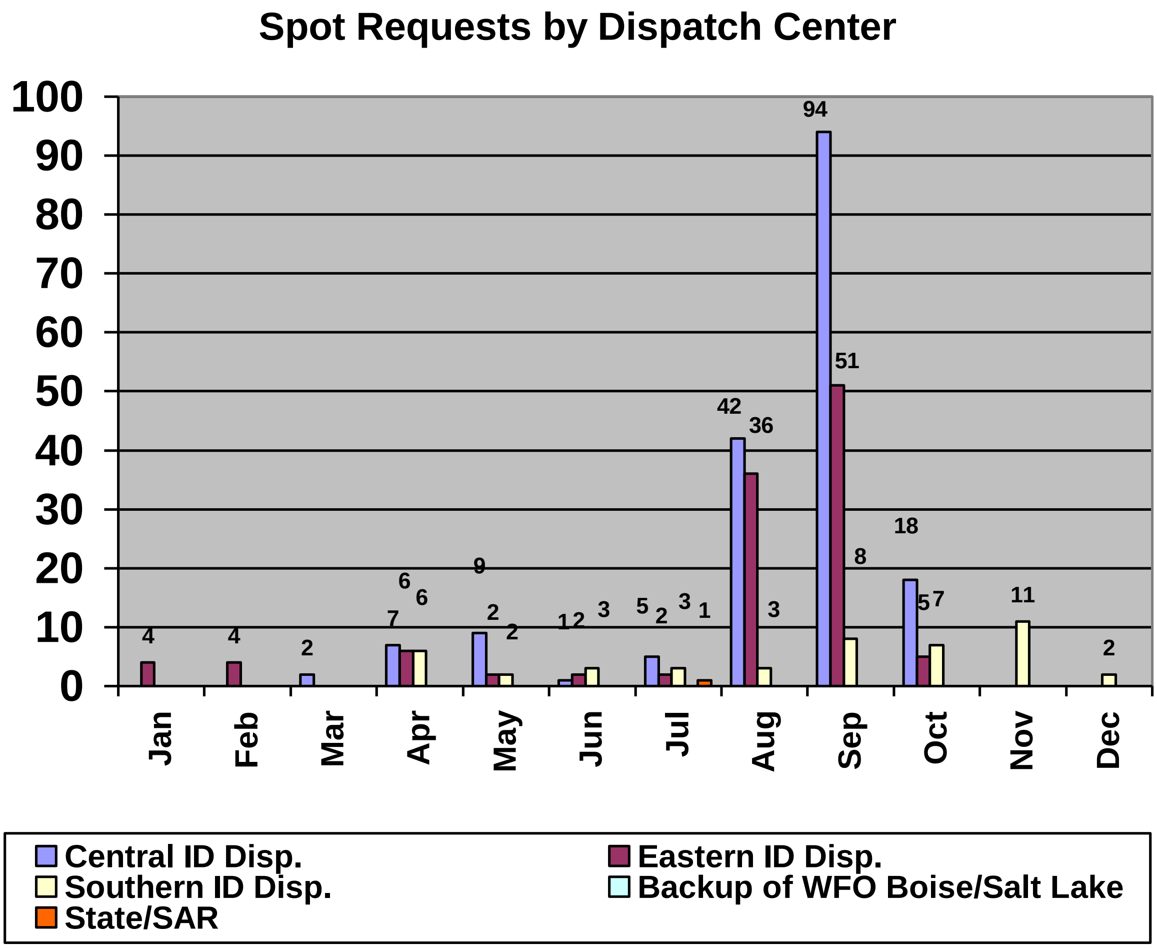

Figure 5.3(b) Spot Forecasts requested by dispatch area during the 2011 fire season in Southeast Idaho.

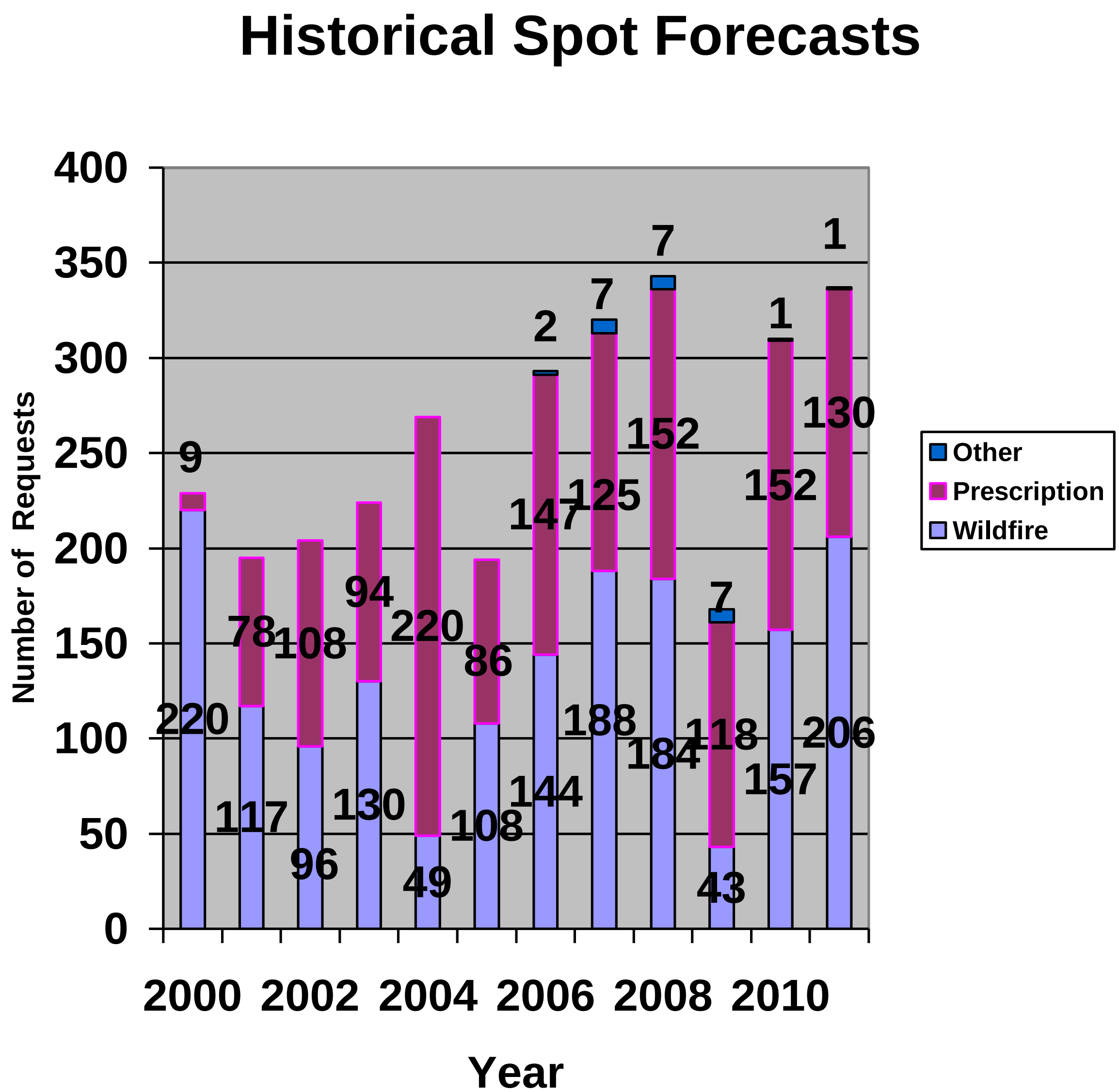

Figure 5.4 Historical trends in Spot Forecast requests for the Pocatello Fire Weather District. There were 337 SPOT forecasts provided in 2011. The record for the National Weather Service Office in Pocatello is 347 SPOT forecasts in 2008.

5.3 Fire Dispatches Supported by WFO Pocatello: There were four IMET dispatches this fire season resulting in 35 man days served out of the office.

Date	*Dispatch Location*	*Incident Meteorologist*
June 01 to June 05, 2011	Bear-Purgatoire Fires Colorado State Division of Forestry Near Trinidad, Colorado	Bob Survick
June 05 to June 18, 2011	Wallow Fire Zone 1 North Apache-Sitgreaves NF Near Eagar, Arizona	Bob Survick
August 24 to September 02, 2011	Hole in the Wall Fire Shoshone NF Near Clark, Wyoming	Bob Survick
September 09 to September 15, 2011	Cactus Mountain Fire Wallowa-Whitman NF Near Imnaha, Oregon	Jack Messick

Table 5.3 Incident Meteorologist Dispatches by WFO Pocatello

5.4 Training: WFO Pocatello staff participated in the following training courses during the 2011 season.

Forecaster	Training situation
Bob Survick and Jack Messick	National Incident Meteorologist Workshop held March 21 through 25, 2011 in Boise, Idaho.
Dean Hazen and John Keys	Completed ICS-300 Intermediate Incident Command System, February 9, 2011.
Dean Hazen	Completed ICS-400 Advanced ICS, March 9, 2011.
Dean Hazen, Vern Preston, Troy Lindquist	Completed L-952 Public Information Officer (PIO), June 13-17, 2011.
Rick Dittmann	Instructor S-290 Intermediate Wildland Fire Behavior, May 23-24, 2011 at the Central Idaho Interagency Fire Center, Salmon, Idaho.

5.5 Field Visits: The staff at WFO Pocatello participated in seven interagency meetings this year.

Location	Dates
Ground Hog Day Chili Cook-off National Weather Service Office Pocatello, Idaho	January 28, 2011
South Central Idaho Interagency Coop/FMO Meeting South Idaho Interagency Fire Center Shoshone, Idaho Bob Survick	February 23, 2011
Spring Operations Meeting Eastern Idaho Interagency Fire Center Idaho Falls, Idaho Bob Survick	May 10, 2011
Eastern Great Basin Predictive Services And National Weather Service Post Season Meeting Via teleconference this year Dean Hazen	November 30, 2011

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